Integration of Technologies (ICTs) in Teaching:

A Case of Buea University, Cameroon

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ABSTRACT

This study investigates barriers to the integration of Information and Communication Technologies (ICTs) in teaching with special focus on the Faculties of Education and Health Sciences at the University of Buea. It also looks at the views and actual use of ICTs by faculty members of the aforementioned Faculties. The study adopted a qualitative approach. A face-to-face interview was conducted with fourteen faculty members of these two faculties, together with other university officials. Documentaries, policy documents and Internet sources were also consulted for existing literature.

Data analysis revealed that faculty members of these Faculties perceive there is a comparative advantage over the traditional teacher-led method and are willing to integrate them into their lessons, but fall short of financial, technical, material, and human resources. It revealed a number of obstacles that lie at the level of faculty members; the institution and the state which perturb the integration of ICTs in teaching in these Faculties. It was also realised that the most critical barriers lie at the level of the state, which until now has no detailed well-defined ICT policy document for higher education institutions, and as a consequence, universities have not made ICTs in education a priority.

The study is important because it unveiled the barriers to the integration of ICTs in university to teaching, and the levels at which they are rooted. The Faculties of Education and Health Sciences and the entire University can use these barriers to seek ways to overcome them and engage in ICTs use in education.

The study concludes that, the long time reluctance of societies to accept and embrace science is affecting its methods of research especially in developing countries. Equally, the late penetration of ICTs in developing countries is affecting their institutions. Also, that so long as the quest for more knowledge continue to grow, more new and sophisticate methods will be deployed to go about this, and it is the responsibility of all societies to endeavour to keep to the pace in order not to be left behind. However, this integration will hardly come easily because the faculty members have mixed feelings about ICTs credibility in teaching as compared to the traditional methods. We recommended in this study that, faculty members as well as higher education institutions should be motivated in the various ways so that the importance and benefits of ICTs in education, in daily life and in the entire society be felt in Cameroon as it aims to become an emerging nation in the year 2035.

DEDICATION

I dedicate this work to my dearest parents: Marcus Zech and Theresia Chiamoh.

ACKNOWLEDGEMENT

My immense thanks go to God Almighty for the gift of life, protection and favour. I equally thank my parents for bringing me up to what I am today. I am grateful to the faculty of Education and the University of Oslo for offering me the opportunity to study this program. The same thanks go to the University of Buea and the participants for collaboration and for allowing me to conduct the study.

I am heavily indebted to my supervisors; Professor Eevi E. Beck and Dr Teklu Abate Bekele for their unconditional support, being able to bear all my odds and standing beside me from the beginning to the end of the study. They were always there and ready to do all it took for this study to be conducted. Professor Eevi from conception of the topic pinned on it for more than one year, was constantly reshaping things, and determined to see it go through. While, Dr Teklu Abate Bekele took his time to search and suggested additional literature list for the study. I appreciate all my lecturers of the program for their efforts.

I am also grateful to Sundeep Sahay, who informally (without ever meeting the researcher or without being assigned by any institution) gave a sense of direction to the topic. In the same line, I will like to appreciate efforts of Professor Titanji Peter Fon (HOD for Educational Foundation and Administration at the University of Buea) who began contacts before fieldwork and abandoned his own pressing needs to get involved in the entire data collection process at the field. This same appreciation goes to his colleagues of Education and Health Sciences Faculties. I also appreciate the hospitality of Dr Nkweteyim Denis (Head of the IT Unit at Buea University). He was always ready to furnish me with any information in the field and I will never forget his countless email correspondences for more information when I returned from the field. The efforts of Abonyi Usman Kojo (my classmate) are also recognised. Despite his own heavy load with thesis, he pressed things and created time to proofread my own work.

I will not also go without thanking the authors of sources/links consulted during this study and all other people who helped in one way or the other in the study process.

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ABBREVIATIONS

AAU	Association of African universities
ICTs	Information and Communication Technologies
ICT	Information and Communication technology
HOD	Head of Department
IT	Information Technology
OCED	Organization for Economic Cooperation and Development
CIA	Central Intelligence Agency
AD	After the dead of Christ (Latin: Anno Domini -for 'The Year Of Our Lord)
UN	United Nations
UNO	United Nations Organisation
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific, and Cultural Organization.
NAICT	National Agency for Information and Communication Technologies
NGOs	Non-Governmental Organisations
CAUDIT	Council of Australian University Directors of Information Technology

1 Introduction and Background

1.1 Introduction

The world and aspects that constitute life on earth have changed since the beginning of time and will continue to change, with new forms emerging and old ones refashioned. New socio-cultural settings will continue to emerge as generations go by. " Though evolution, according to biologists, archaeologists and anthropologists, characterized the history of life since millennia, there were also some relatively speaking rapid and striking forces that transformed cultural, economic, social and political conditions of human existence" (Bekele 2004: 4). As observed in the world today, these changes have and will be dominated by the innovators or the early adopters of the change while those who are not informed or cannot immediately afford will embrace such changes too late.

One of these recent changes is the emergence of Information and Communication Technologies (ICTs) during the second half of the of the 20th century, in which the computer and the Internet are now being highly used to procure, process, store, communicate and apply information/knowledge. With the emergence of this Information age, the world has become a global village with global interconnectedness, with internal and international borders becoming bridges. Many societies in the developed as well as in the developing countries are using these devices to build up knowledge as a new weapon for rivalry and growth, for example, fighting against poverty, access to education and health services, transformation and modernisation of the economy, the government and the entire society (Hare, 2007) . Castells (2000) says that, ICTs act upon all domains of human activity and make it possible for endless connections to be established between different domains, as well as between elements and agents of such activities. Database systems are developed for all sorts of storages, retrieval and communication when need be; products are bought and sold in distant places electronically (online marketing) within limited time.

Higher education institutions, national governments, and international organisations have put a lot of emphasis on the importance of ICTs in today's society, with their teachings, training, and integration counting on universities and other higher education institutions. Even though Oliver (2003) asserted that education in particular has not actually felt the impact of ICTs, the situation has changed from then and today, health education, economic education, engineering

education, military education, now depend on the new ICTs for research, communication, and application of research results. Ayoo (2009), remarks that, ICTs at the same time continue to impact on all aspects of cotemporary education, requiring higher education institutions and stakeholders to be linked to each other through an advanced network that is connected to the global village. Students and teachers, and researchers now interact online without necessarily meeting face-to-face frequently. Some universities today operate as virtual universities or with virtual libraries. The new technologies have led to the development of off-campuses degree programs, new forms of learning in different environments or settings. For instance, today we hear of or use e-learning, Blended learning, and open and Distance learning.

This trend will continue to grow with higher education institutions and universities (described by Gornitzka *et al* (2007) as key institution of the modern society and Association of African Universities - AAU (2009) as intrinsic parts of the fabrics of the society), highly implicated either directly or indirectly. This require them to carry out their functions- research and teaching being the most pronounced ones, in today's context of globalisation by integrating ICTs. "In a networked global environment in which every university is visible to each other, it is no longer possible for nations to completely seal off themselves from the global effects (Marginson et al, 2007). In addition, AAU (2009) holds that ICTs will offer universities tremendous new possibilities in research and teaching, and open wider access to information. It adds that, universities have been at the forefront of ICTs development as well as integrating and adopting these technologies into their work especially teaching, research and learning, will be of greater help to them. Lastly, that as universities develop and expand the use of ICTs in their activities, this will strengthen their capacity to enhance and respond to new challenges.

Despite all these claims about extraordinary role of ICTs, there are some strong debates about their effectiveness in today's higher education institutions. Even though, he recognises that education is in the state of rapid change, Sahay (2004) holds strongly that ICTs are or may pose a great threat to students' autonomy, which can even be potentially undermined. He equally argues that while others see ICTs as ushering in new and exciting era in education, others argue that ICTs rob education of its traditional association with books and scholarships. After placing a lot of importance on the ICTs usage like supporting and facilitating learning, teaching, communication and information management, Bekele (2004) made it clear that users perceive that theirs usage brings stress, ruins privacy, misuse of intellectual resources,

and diminish physical social contacts. Keogh (2001) also noted that ICTs pose some threats to the society like creating a social exclusion and creating a society of technological haves and haves not. They enhance competition in higher education institutions requiring them to reconsider their visions, roles, profiles, positions and make new alliances (Ibid). Wende and Beerkens (1999) also remarked that these devices in higher education are very expensive and generally cause cultural imperialism. Many in the academia still believe that it is difficult to completely take away the physical contact between learners and teachers because face-to-face meeting with students is very essential for certain aspects of teaching and learning.

Keeping aside their disadvantages, they still occupy a big place in higher education. However, developing countries are not rapidly responding to these growing demands and new challenges, though it may be expected that they will make an effort in the coming years. Rena (2008) also reiterated that Africa is one of the most under-served continents in terms of information and communication technologies. The North-South digital divide is still very wide and can open more widely if nothing is done to close up the gap. Developing countries should therefore, integrate ICTs into higher education with the ability, capacity, and necessary skills not only to educate students, and to generate new knowledge, but also to enhance national development and connect themselves to the global village.

Much has been written about the role of ICTs in teaching with much attention on developed societies and pre-university education. There is therefore a question as to whether these can be generalised to other societies in the world or the update of this is known. The answer of course may be no, and this is why the study was carried to present the picture of how the situation looks like in a developing world context. Africa does not have enough ICTs use information, as it is needed for example, AAU (2009) remarks that, there is a substantial digital divide between African universities and those elsewhere due to their differences in ICT availability, access, and affordability and capacity. It further adds that this gap can and must be bridged because if time is wasted, it will openly more widely. Chilenga (2008) notes that most of the ICT research in Africa come from South Africa, followed by Nigeria and Botswana, but even if all research done in Africa is added up, it is only 9% of the research done in Africa by African institutions. This means that about 91% is done by aliens and or is not done at all.

Farrell and Shafika (2007) indicated that much has been said about ICTs in African education for example, the rhetoric digital divide, scattered and uncoordinated initiatives of ICTs

utilising benefits, demonstrated interest from African policymakers on the use of ICTs to develop Education for All (EFA). They further remarked that despite all these, there has been no consolidated documentation of what is actually happening in Africa in this area, or a comprehensive baseline data on the state of ICTs use in education in Africa against which future developments can be compared. While carrying out an ICT survey in education on a country-to-country basis in Africa, they revealed in their study that donor agencies, governments, civil societies and private sector interested in ICTs and education issues in Africa are usually frustrated by a completely lack of information or an unreliable data. Bekele (2009: 1) also remarks that "almost all previous studies are conducted in the western context and hence, the validity of such findings to other environments such as Africa is unknown".

All these indicate that there is an existing knowledge gap as far as the use of ICTs in teaching in African higher education in concerned. For universities and their countries to bridge this gap as AAU (2009) reiterated, their individual situations in terms of views, barriers, and actual use must be identified and studied so that measures can be taken. This study is out to contribute to this knowledge gap by unveiling the barriers to the application of ICTs in teaching in the Faculties of Education and Health Sciences in the University of Buea, Cameroon. It looks at how lecturers of the two Faculties perceive or value these technological devices in delivering their matter to students and how they actually do this.

Thesis layout

The study is divided into six chapters. Chapter one presents the introduction and background, aim, significance and rational of the study, site and the research questions. The next chapter, two is about conceptual framework and chapter three is on review of literature. Chapters four and five deal with research methodology and presentation of findings and analysis respectively, while chapter six is discussion, recommendations and conclusion.

1.2 Problem statement

Even though the world for some decades now has been witnessing an economic downturn, the use of ICTs particularly, the Internet, telephony and the computer, is on a surge. The world today is rapidly becoming a place for knowledge competition for economic growth driven and enabled by ICTs. This is in line with what Ssewanyana (2007) says that ICTs have been

identified in almost all societies in the world as a driver and an enabler of economic growth and change.

Despite this importance of ICTs, there is still a North-South digital divide due to access, poor inadequate policy documents and policy instruments, weak ICT institutions and insufficient financial, and human resources and consistent power cuts or absence. In 2007, developed countries had 62% per 100 inhabitants using the Internet as opposed 17% in developing countries. According to International Telecommunication Union (ITU) (2009), 70% of European population had access to the Internet, 48.3% in Americas, and only 8.8% in Africa. Again, Sweden had a percentage of 90.8, Finland 84.1% and Iceland 93.5%, while Cameroon had 3.3%, Burundi 0.4% and Burkina Faso 1.1%. This is a problem because such a situation is an obstacle to the benefits of ICT in all lifestyles with higher education being one of them. Higher education institutions in Africa and Cameroon in particular basing on this seem "disconnected" from the other connected universities of the world.

One of the greatest hardships endured by the poor, and by many others, who live in the poorest countries, is their sense of isolation. The new communications technologies promise to reduce that sense of isolation and to open access to knowledge in ways unimaginable not long ago (World Bank Report, 1998). Mbarika, (2006; 2010) also says that African problems cannot only be reduced to lack of roads, food, water, electricity, etc; but there is a real need for ICTs in Africa today for the continent to develop, and that Africa missed the train during the industrial revolution and cannot afford to miss the ICT revolution.

This integration on ICTs in higher education in Africa seems to be marred by access and training. Early models of educational change implied that, if teachers had access to enough equipment and training, classroom integration would follow" (Fish, Dwyery, & Yocam 1996; Ertmer,1999). Traditional educational environments do not seem suitable for preparing learners to function or to be productive in the workplace of today's society (Yelland 2001). Lecturers may be unable to engage in off-campus delivery and exchange programs if they do not have and know some ICT basic knowledge for course delivery in education. This situation prompted this study as can be seen in the aim and the significance of the study in the following paragraphs.

1.3 Aim and Significance of the study

"By being aware of the various barriers and strategies, teachers can begin to develop the skills and strategies needed to overcome each of the different types." (Ertmer 1999: 50). Balnaskat *et al.* (2006) support this by saying that in order to ensure realistic and holistic solutions for policy makers, the factors that prevent teachers from making full use of ICT must be identified and understood. The study is significant because, it identify this inhibitive factors and this will assist managers, administrators, educators, students and researchers to identify, understand and try to overcome the views and barriers of integrating ICT in teaching, learning, and research.

The University of Buea has in its University strategic plan (2007-2015), articulated "a 100% improve Internet connectivity/availability by increasing bandwidth by 2015. There is a greater need for computer-assisted instructions and computer-managed instructions. Hence, it is clear that the integration of ICTs into the university systems depends not only on access and on availability, but also on the extent to which staff and students embrace the technologies. For universities wishing to integrate IT into their curriculum, lecturers (faculty members) are an important group of users who play a vital role in the successful implementation of new information technologies (Agbonlahor 2006)

This will then help them to become successful technology late adopters (ICT-based teaching and learning) in the future especially as Khalid (2009) says, the use of ICT in the classroom is very important for providing opportunities for students to learn to operate in an information age. According to Agbonlahor (2006), the understanding of the characteristic and individual usage level of ICT is required in designing and implementing appropriate institutional policies for promoting effective use of ICT by lecturers in teaching, learning, and research. This can in turn help the institutions and university authorities to begin designing ICT policies and developing technology-facilitated educational programs because the role of ICTs in higher education will grow more and more in the days ahead, and because, lack of ICTs has been identified as one of the main factors hindering development in the developing world. With this aim, it was necessary to find out how to go about achieving the above-motioned aims. The following research questions were then posed to attain the aims.

1.4 RESEARCH QUESTIONS

1. ***How do faculty view the role of ICTs in teaching?***

This question is intended to find out what faculty thinks about the place of ICTs in teaching. It is likely that some faculty may see ICTs as a means while others see them as obstacles to their teaching.

2. ***How do faculty actually use ICTs in teaching?***

Having ICTs is one thing and actually using them is another. The purpose of this question is to find out how those faculty members who use ICTs in teaching really do this and how successful do they do it or think that they are.

3. ***What are the main barriers that impede effective use of ICTs in teaching?***

Different societies have embraced ICTs differently and at different time and degree. New ones are coming up with multiple use functions, so there is likely a high probability that intended users face some challenges using the devices. The question is intended to investigate these challenges in the Faculty of Education and Health Sciences at the University of Buea.

However, before we get into exploring these questions, it is essential to situate the study area and how its education status has evolved. The following section looks at Cameroon history and education evolution in brief.

1.5 A Brief History of Cameroon and Evolution of Education before Independence

1.5.1 Brief History

According to Neba (1999), the Republic of Cameroon is located on latitudes 2º and 13 º North of the Equator and longitudes 8 º and 16 º East of the Greenwich Meridian. It is found in Central Africa with Yaoundé as the headquarter, even though some sources place Cameroon in West Africa. The country is bounded by Nigeria in the West, Gabon, Equatorial Guinea, and Congo in the south, in the North by the Lake Chad basin, and Chad and Central African Republic in the East. Due to its demographic and cultural characteristics, geographic

diversity (particularly pedology, climatology, and biodiversity), etc, the country is known as a microcosm of Africa. Owing to its long political domination and history, Cameroon is a bilingual country with French and English as its official languages.

According to the CIA World Fact Book (2010) on demographic statistics, Cameroon has a total population of about 19,294,149 inhabitants with a growth rate of 2.19% and economic growth rate of 2.8%, and a human development index of 0.46. According to World Ethnology, the number of individual languages listed for Cameroon is 286.

Archaeological findings show that humankind has been existing in Cameroon for at least fifty thousand years, with very important and strong kingdoms. One of the most prominent was the Sao which was found around the Lake Chad area in about 5th Century AD (Fanso, 1989). From the 15th to the 19th century, the Cameroon population witnessed several waves of North-South and centre-south, east, west and south migration and today, the country has about 250 ethnic groupings. This migration mostly due to political domination, slave raids, dynasty quarrels, and economic purposes.

By the early1800s, conquest, Islam, and commerce forced people in different regions of Cameroon to move. Islamic flag-bearers of Uthman Dan Fudio like Modibo Adama forcefully spread Islam in North Cameroon and so many people decided to flee to the south and centre (Ngoh, 1987). While Islam was in the northern part, Christianity was in the south entering through the coastal regions spreading the gospel and education. As from 1845, British Baptist missionaries led by Alfred Saker started establishing schools in the coastal regions and inwards towards the hinterlands. This marked the coming of Islam, Christianity and formal western education to Cameroon. Consequently today, the country is made up Muslim north and Christian south, with intermixture of the two, with others and traditional beliefs.

According to Fanso (1989), Cameroon has undergone several political transformations in its name and organisational structures resulting from the long European imperialist rule. In 1472 a Portuguese explorer Fernand do Po came as the first European explorer to the coast of Cameroon. Hanno – Carthaginian however, reached Cameroon 2000 years before him and named Mount Cameroon “chariots of the Gods as he saw it from afar spitting fire.” At the Wouri River in Douala, Fernand do Po found many shrimps and named it Rio dos Cameroes-Meaning River of prawns. This marked the evolution of the name Cameroon today.

During the Scramble for Africa from the 1880s, Germany annexed Cameroon and Cameroon remained her colony from that time until the end of the First World War in Cameroon in 1916, and she changed Cameroes to Kamerun. Britain and France seized Kamerun from Germany after the end of World War I and partitioned it among themselves to compensate the losses incurred during the war. Cameroon was now in two entities, recognised by the League of Nations in 1922 as mandated territories. French Cameroun was therefore administered as part of French Equatorial Africa while British Cameroon was administered as an integral part of Nigeria. After the Second World War in 1945, the two Cameroons were assigned again to Britain and France as Trusteeship territories under the supervision of the United Nations Organization.

In 1960, French Cameroon gained its independence as La Republic du Cameroun (The Republic of Cameroon). In the course of deciding their fate through a UN supervised plebiscite in 1961, British Southern Cameroon opted to reunify with French Cameroun. Britain Northern Cameroon joined with Nigeria. The country was then known as the Federal Republic of Cameroon consisting of East (former French Cameroun) and West Cameroon (former British Southern Cameroon). By 1972, the two Cameroons massively voted for a unitary state in a referendum and its name changed again to the United Republic of Cameroon and in 1985, it became known as the Republic of Cameroon, with the intension to wipe out the "Unitary notion," which reminded Cameroonians of their joined but divided entities.

Summarily, Cameroon has four important historical dates and change of name as from the 1880s.These are 1884; annexation by the Germans; 1916, end of World War I and the partition of Cameroon between France and Britain; 1960-61, independence and reunification and in 1972, referendum for a one and indivisible Cameroon.

1.5.2 Evolution of Education in Cameroon

- **Pre-University Education**

There was no form of higher education in Cameroon before independence in 1960. Pre-colonial education was informal, consisting of parents passing on information, teachings and way of life to children or the next generation. European missionaries used education to preach and spread the gospel. Formal education came to Cameroon in 1884 through European exploration and exploitation. Formal education was therefore introduced in Cameroon by

missionaries in 1844, with the first primary school opened in Bimbia (Jackson1967; Tchombe, 2001). Attendance in these schools was however, voluntary. British missionaries translated the bible into the native language after learning it. Before the German annexation of Cameroon in 1884, there were 15 mission primary schools in Cameroon with about 368 pupils sponsored by the London Baptist Missionary Society. Teaching at this time was totally teacher-led with fingers and counting sticks used in calculations.

After annexation, schools were opened in Douala, Garoua, Limbe and Victoria between 1987-1910, with a curriculum to teach the "Three Rs" (Reading, Writing and Arithmetic) and religion and the German language. The Germans did not expand education and it was in the hands of Merchants (Tchombe, 2001). Cameroonians were given the opportunity to further education in Germany in order to effectively enforce the German colonial policy. Elementary education was made obligatory and the German administration gave subvention to mission schools. Before the Germans were ousted from Cameroon in 1916 after the end of the First World War in Cameroon, a total number of 531 primary schools were found in the country with an enrolment of 341117 pupils. The few middle schools that existed could be attributed the status of secondary education (Admin 1997; Tchombe, 2001).

During the rule of the French beginning from 1914 to 1960, education was still largely under the missionaries and French was strictly the only medium of communication and instructions in schools. The curriculums however, changed to prepare children for secondary education by teaching children Cameroon-based issues and metropolitan issues. The educational cycle and entry age evolved to six years in primary school and by 1945, education was classed into levels and certificates awarded (Tchombe, 2001). A ministry of education was set up in 1952 to improve and encourage girl child education especially in the North part of Cameroon where the rate of literacy was and it is still largely low. Secondary schools also existed and end of course examination like Baccalaureate taken by students were assessed in France using the French evaluation standards.

In British southern Cameroon, education was centrally controlled and dominated by the Indirect Rule policy. The Native Authorities and the British administration cooperated to provide education in Cameroon with education cycle as nine years before 1932 (Tchombe, 2001). The Vernacular was prohibited only in government schools because children came from different linguistic backgrounds. Education was free at the infantry level. Primary

schools prepared children for the Standard Six Certificate marking the end of the primary school (Ibid).

Enrolment and the number of institutions in French Cameroun were far more than British Cameroon. At independence, French Cameroun had 977 primary schools and 20 secondary schools while British Cameroon had only 499 primary schools and 6 secondary schools. For enrolment, French Cameroon had 515635 pupils and 4742 students, while British Cameroon had 86257 pupils and 903 students only (Tchombe, 2001).

- **Evolution Higher Education**

The period between 1962 to 1971 was marked by the setting up of the present-day Cameroon higher education structure and system. The period from 1962-1967 witnessed the creation of general education structures (faculties), while the period after 1967 was devoted to building professional and technological schools. By 1974, Cameroon therefore possessed at the structural level its two principal types of higher educational establishments: fundamental education and technical and professional education (Njeuma, Nkweteyim *et at.*1999). Higher education in Cameroon emerged in the 1960s immediately after independence. When French Cameroon achieved its independence from the French on 1st January 1960, there was a need to train people who could replace the colonial regime and serve their country. Consequently, by 1961, the French government and UNESCO assisted in the creation of the National Institute for Universities studies (Institute National d'Etudes Universitaires). This Institute had to prepare students and award degrees in various fields like Law, Economics, the Arts and Human Sciences, Pure Sciences. Its mandate was to prepare students for degrees in Education, Law, Economics and the Arts (Njeuma, Nkweteyim at al. 1999). By 1962 after reunification of the two Cameroons (East or French and West or British Cameroon), it was transformed into a full status university known as the Federal University of Cameroon (with 600 students), made up of Faculties, Institutes, Centres and Schools each with specific missions. The reason here was for it to take control over the training of senior services in Education, Technology and Science. At the same time, professional programs were created in the school of Administration and magistracy (ENAM) in Yaoundé and the school of Agriculture (ENSA) in Dschang, the Military Academy (EMIA) in Yaoundé and the School of Education (ENS) in Yaounde (Njeuma, 2003). However, ENAM and EMIA were and are

not attached to any university probably because of their strategic/political importance to the state and the regimes.

This Federal University of Yaoundé seemed not to be satisfying the needs of the country and the labour market and between 1969 and 1971, several other professional schools were created and attached to the lone Federal University. These were the University Centre for Health Sciences (CUSS) 1969 in Yaounde, the School of Management in Douala (IAE), the School of Journalism and Mass communication (JMC) in 1970 in Buea. In 1971, the International Relations Institute (IRIC) and the Engineering School (ENSEP- today known as the Technological pool of the Central African Sub region) were created in Yaounde. All these were government strategies to decentralise the already saturated University of Yaoundé (the name it was given in 1967) and because there was a mismatch between those graduates and labour market and between those who pursued their studies abroad before independence and the Cameroonian realities and needs at this time.

From 1960 to early 1990s, most higher education systems in developing countries were heavily burden by their inability to adequately serve the changing needs. Student enrolment was surging, and public funding was retrenching. In Cameroon, student enrolment rose from 600 in 1962 to 45000 in 1991 with no corresponding increment in teaching staff and lecture halls. Besides, graduate unemployment was also surging and French dominated the lone university of Yaoundé as the only medium of communication and instructions.

As a response to these problems, a Presidential Decree of 19 of Jan. 1993 "Reorganizing, Restructuring universities", split the lone University of Cameroon into other six state universities. These were the universities of Yaounde I, Yaounde II in Soa, Buea, Dschang, Douala and Ngaoundere , all of which were formerly university centres. Today, Cameroon counts eight state universities with the most recent being the Universities of Maroua created in 2008 and the University of Bamenda in 2010. These institutions are presented in Appendix B. These public universities have been attached professional schools. The paradox is that the pre-1993 university problems in Cameroon have not witnessed any significant change. The country also has a few private universities though not all may be legally supposed to operate. The 1993 university reforms also legalized the creation of private high education institutions in Cameroon and today there are more than half a dozen of them operating in the country.

Cameroonian universities award degrees such as Bachelor, Maitrise (abolished in 2006-2007), Master's and a PhD. Entry requirement to higher education is GCE Advanced Level and the Baccalaureate. However, following the signing of the 1998 Bologna process by Cameroonian universities, degree programs by 2006 were harmonised to 3+2+3 cycle of degree structure. Higher education in Cameroon includes universities, colleges, and professional schools. In general, it means any form of education that requires GCE Advance certificate or Baccalaureate to qualification for entry requirement.

1.6 The study site (The University of Buea)

Until the creation of the University of Bamenda by the end of 2010, the University of Buea since 1993 has been the lone Anglo-Saxon university in Cameroon. Between 1967 and 1970, the University of Yaoundé was so congested amongst other reasons and in order to decongest it, the Cameroon government created University Centres in various regions. By 1993, these University centres experienced massive student enrolments amongst other problems and in response, a Presidential decree NO 93/034 of January 1993 transformed all these university centres to full state universities. Even though enrolment and other problems were surging, some of the University Centres were underutilised, for example, the University of Buea had a capacity for 2000 students but enrolled only 60. Since then, this number has more than doubled itself to 15732 students by 2010 with an annual student growth of more than 8.9%.

The decree determined and defined administrative and academic organisation of the universities including Buea. This university was placed under the supervision of the state through the Ministry of Higher Education, which is tightly centrally controlled.

It has a Mission to provide opportunities for quality teaching and research in a conducive environment, and in a manner, that makes its graduates relevant to the needs of the job market (University of Buea's Strategic Plan 2007-2015). The university is dedicated to the continuous quest for excellence in research, the promotion of moral and human values, and service to the community. Conceived in the English speaking tradition, the University of Buea seeks to foster the essence of that system, while situating itself within the larger bilingual and multicultural context of Cameroon. Its teaching and research programmes emphasise relevance encourage tolerance and promote creative, critical and independent thinking. The University of Buea seeks to foster collaboration and maintain a cordial relationship among all

stakeholders and, especially, to promote the welfare of staff and students who are key actors in the university system (Ibid).

This study considers two Faculties, namely, Education and Health Sciences. The Faculty of Education is made up of three departments, which are Curriculum Studies and Teaching, Educational Foundation and Administration and Educational Psychology. It has a student enrolment of 2828 and 14 lecturers. It offers five undergraduate programs, five master's degree programs 5 PhD programs, one graduate diploma, and 1 professional teacher program in Higher education.

While the Faculty of Health Sciences offers 8 academic programs with five departments (Biomedical Sciences, Clinical Sciences, Medical Laboratory Sciences, Nursing and Public Health and Hygiene). For these programs, three are undergraduate and five Master. It had a student enrolment of 723 and 24 Lecturers by the end of 2010. This Faculty is still in its PhD course provision process, with declaration of the Minister of Higher Education in 2006 for the Faculty to train medical doctors and other professionals of the health sciences at all levels as needed. (University of Buea Strategic Plan 2007-2015).

Table 1: Portrait View of aspects in the University of Buea from 1990-2010

Resources (fiscal, human and material)	1990	2010
Number of professional programs	2	32
Number of departments	2	30
Number faculties/ Schools	1	6
Research Funds (million FCFA)	1.3	-
Number of Administrative staff	86	289
Number of Academic	6	289
Carrying capacity (number of seats available for students)	1625	10295
Enrolment	65	15732
Grants	-	>44,220.88 USD
Number of volumes (Books) in library		26780
Student annual growth rate	-	8.9%

From field observation

The table 1 above shows the enrolment, academic and resources evolution from 1990 to 2010. This indicates that student population as well as the staff has being growing tremendously. This evolution has however, not seen an evolution of teaching methods. Normally, the evolution could have considered the use of ICTs to enhance administration and curb massification.

In order to answer the above research questions it was relevant to explore some literature review and conceptual framework to understand what others have written about the topic. This then helped to identify the context in which other authors wrote and where they based their arguments. This eventually helped us identify the gaps and other issues that were left out or have evolved over time since the various authors published theirs. The similarities as well as the differences between these works were also critically analysed with respect to present context and study at hand. The following section therefore contains the concepts and literature that guided this study.

2 Conceptual Framework

Scientific research is directed towards either the testing of available theories or the development of new ones that explain phenomena better (Dyer, 1995; Bekele, 2009). This study investigated the barriers to the application of ICTs in teaching at the University of Buea. It also looked at the actual use and views of faculty members in the integration of ICTs in teaching. This chapter deals with the conceptual. Many ICT theories and empirical studies exist, with most of them dealing with ICTs at global, national levels or in commercial terms. Some however, have concern for education. Three conceptual frameworks were used in this study because the research questions raised could not be sufficiently answered with the use of a single concept. These consist of the model of success and success factors formulated by Bekele (2009); The Innovation Diffusion Theory of Rogers (1983), which demonstrates the stages of adopting an innovation in the society and, thirdly, barriers were identified and analysed using the classification of Balnaska et al (2006) which shows how ICT integration in teaching can be hindered in education institutions.

The study therefore, verified to determine whether these theories reflect the ICT situation in these two Faculties of the University of Buea and what they have left out relative to this university's context. This was a contribution and justification of the study.

This section is divided into two parts following the nature of the research questions, one on the conceptual frameworks about the views and actual use and another on the conceptual framework about the barriers to integration of ICTs in teaching.

2.1 Conceptual framework on barriers to integration of ICTs in teaching

The first conceptual framework here is the model of success and success factors formulated of Bekele (2009), in which he noted that, a number of factors influence the success of Internet-based learning environment. These are human factors, course factors, leadership factors, technological factors and pedagogic factors. Factors that deal with student and faculty member characteristics (their understanding and perceptions) are known here as human factors. These factors are level of motivation, ICT skills, attitude towards technology and experience.

Pedagogic are factors referring to how learning and instructions in online environments. This framework shows that if faculty and students have available varied tools, their usage, communication/collaboration, and integration will be eased and efficient. For pedagogic factors, these refer to the nature of leaning and instruction in the online environment. Success will occur if learning is student-focused, collaborative, problem solving and feedback intensive.

Technological are factors here are the capabilities and attributes of educational technologies and access to them. These factors are Asynchronous, synchronous, multimedia, friendly, dependable, layout, alternative tools, and capacity/speed. He remarks that these factors are linked to capabilities or attributes and access to the devices.

Course factors in this framework are the elements needed in the instructional design. For example, course organisation, relevance to student needs, clearly defined goal and expectations, flexibility, appropriate breadth and depth. The model indicates that, these factors are very crucial factors for success measures in such a learning environment.

Lastly, the leadership factors here refer to the role played by university authorities. He sees these as the key impact to the other factors directly and measures only indirectly. According to him, this should be effectively implemented by providing training to both students and faculty, putting in place a permanent staff and student helpdesk, establishing ICT laboratories for experiments, hiring teaching support staff and putting in place all required logistics for ICT-related learning.

It helped to class the barriers identified from field data into the framework the model proposes. This is because the study for which this model was generated was partially carried out in a developing world context and it is likely that developments in ICT may be similar in one way or the other. However, this framework is mainly concerned with use of ICTs in learning not teaching. The focus here is not on barriers but success factors which if not put in place they become barriers. Therefore, this study looked at these devices in teaching. The study was also carried in a relatively older institutions than this one, and a different context.

Working as a task force for British Educational Communications and Technology Agency-Becta, Balnaskat *et al.* (2006) identified and classified barriers to the integration of ICTs in education into three levels. These levels are Micro, Meso and Macro. Micro-level barriers

according to these authors are those related to teachers' attitude and approach to ICTs. They include lack of teacher ICT skills; lack of teacher confidence; lack of pedagogical teacher training; lack of follow-up of new ICT skills and lack of differentiated training programmes. While, meso-level barriers refer to those of the institutional context, and they include absence of ICT infrastructure; old or poorly maintained hardware; lack of suitable educational software; limited access to ICT; limited project-related experience and lack of ICT mainstreaming into school's strategy . The third category of barriers here are macro or system-level barriers including those of the wider educational framework. These too include rigid structure of traditional education systems, traditional assessment, restrictive curricula, and restricted organizational structure. The study also concluded that little research exist about barriers that exist in specific areas of educational ICT use. They acknowledge the fact that there is need to seek ways in which teachers can overcome the barriers and successfully integrate ICTs in their lessons.

Even though the above framework is about the barriers to successful integration of ICTs in teaching, it is a reflection of a developed country context and it is about five years since it was conducted. It is therefore improper to generalise the framework to suit a global context, since details of how the situation looks like in developing countries are not known. This study therefore considers a developing country context with guidance from this framework. The framework is therefore used to answer research question number three, which deals with the barriers to the integration of ICTs in teaching in the Faculties of Education and Health Sciences at the University of Buea. It helps in classification and analysis of barriers identified.

2.2 Conceptual Framework on Views and Actual use of ICTs by faculty

"Rogers' theory has been widely used in a variety of settings, ranging from diffusion of rural technology among farmers to the adoption of innovations in educational settings" (Berger, 2005; Martins, Steil & Todesco, 2004; Kebritchi, 2008: 4). Another theory used in this work is that of the innovation diffusion of Everett Rogers (1983), in which he presented five stages of technology diffusion in a society or an organisation. These stages are knowledge, persuasion, decision, implementation, and confirmation. It also presented some elements that determine the rate and degree of innovation diffusion. These elements are the innovation characteristic, communication channels, the period, and the social system. The theory also

highlights a number of adopters' category in the social system, for example, innovators, early, late adopters, late majority, and laggards. This rate and degree of adoption however, also depends on the characteristics of the innovation which he says they are its relative advantage, compatibility, complexity, trialability and observability. Everett Rogers' (1983) Diffusion of Innovations theory (DOI) is however, regarded as seminal in explaining the adoption and spread of new ideas in any community over a period of time (Agbonlahor 2006: 264). The theory therefore, offers a powerful paradigm for conceptualizing the development and acceptance of IT by individuals in an organization (Ibid). It seeks to explain how, why, and at what rate new ideas and technology spread through cultures. Diffusion theory, in this light, is very much a communication-based model (Alec Couros, 2003). Adoption of innovation and integration of ICTs in teaching in this light then depends on whether it is viewed as being compatible to lessons or complex, or has been observed and tried.

This theory is so general with innovation diffusion in particular with no direct reference to education. It does not also actually show how people choose to adopt or implement innovations and what happens after adoption? How can organizations help an innovation to be implemented effectively? What kinds of struggles will people have as they implement the innovation (Graham et al, 2007)? This study attempted to go beyond providing answers to these questions. The conceptual framework partially answers questions two and three in this study. The framework has been used in many studies in the developed countries but very little empirical studies in the developing world including Cameroon. The conceptual framework that was hypothesized long time ago and since then education systems and modes of delivery have evolved. This study finds out the applicability of the theory, whether it works in a developing world context.

On the side of the barriers, table 2 below summarises the main themes highlighted in the conceptual frameworks cited above. Their relation, differences and similar is discussed below:

Table 2: A summary of Barriers to ICT in education based of cases reviewed

Balnaskat *et al.(*2006)	Barriers	Micro-level	lack of teacher ICT skills; lack of teacher confidence; lack of pedagogical teacher training; lack of follow-up of new ICT skills and lack of differentiated training programmes
		Meso-level	absence of ICT infrastructure; old or poorly maintained hardware; lack of suitable educational software; limited access to ICT; limited project-related experience and lack of ICT mainstreaming into school's strategy
		Macro-level	rigid structure of traditional education systems, traditional assessment, restrictive curricula, and restricted organisational structure
Bekele (2009)	Factors	Human	Competency, motivation, attitude, experience, learning view, knowledge view, technology view, role in learning, view of technology
		Course	Organisation/structure, quality content, relevance, clear goals and expectations, motivating, challenging, flexible, activities/projects
		Leadership	Technological provision, student/staff training, staff/student helpdesk provision, ICT labs, support teaching staff, other logistics
		Pedagogic	Collaborative, interactive, feedback oriented, problem-based, process oriented, flexible
		Technological	Asynchronous, synchronous, multimedia, friendly, dependable, layout, alternative tools and capacity/speed

Source: adapted from the frameworks reviewed

2.3 Issues emerging from conceptual frameworks and the African context

All the conceptual frameworks in the previous section were used to guide the study. They are in one way or other related to ICTs use in education with some overlapping in different ways. However, these frameworks have been developed in different context than the one the study is intended to. Two (Balnaskat *et al.* and Rogers) *of* the three chosen frameworks are developed country-based and normally, should reflect the cultural, social, educational and economic contexts of economically strong countries (Bekele, 2009).

The use of ICTs in the context of the University of Buea will therefore be a new form or method of the teaching-learning transaction. More to this, the effective use of these devices in teaching in most African institution seems to be marred by a lack of a well defined ICT policy document, human, financial and infrastructural resources. Different societies will therefore have varied levels of challenges in ICT integration in teaching especially in higher education institutions.

The interesting thing here with the frameworks revealed above is that, all are dealing with barriers to integration of ICTs in education. Another similarity is that they all remark that ICTs are changing the landscape of education, and teachers and institutions are facing some constraints actually integrating these ICTs in their lessons. One major similarity between Bekele (2009) and Balnaskat et al, (2006) is that the human factors of the former are embedded in the micro-level barriers of the latter. The two are therefore indicating the barriers that stem from faculty approach to ICTs in education. Also, the leadership factors are similar to the macro-level barriers. This thus, shows the barriers borne at the system level. These barriers and or factors are however, intermixed under the main headlines or themes they presented.

They however, differ in some aspects, for example, Blanaskat et al., (2006) study is based in pre-university studies while Bekele (2009) deals with a university milieu. Again, the former is concerned with teaching while the latter is concerned with learning. Both studies are entirely found in different socio-cultural contexts. Despite these differences, both authors are indicating that there exist some inhibitors to the effective integration of ICTs in education that need to be identified for each sector to seek solutions to them. These conceptual frameworks were extended to cover what was found at the University of Buea. Since this is what is happening in a different context, it is important to see how realistic it is in another and since this classification by Balnaskat *et al,* is based on pre-university levels.

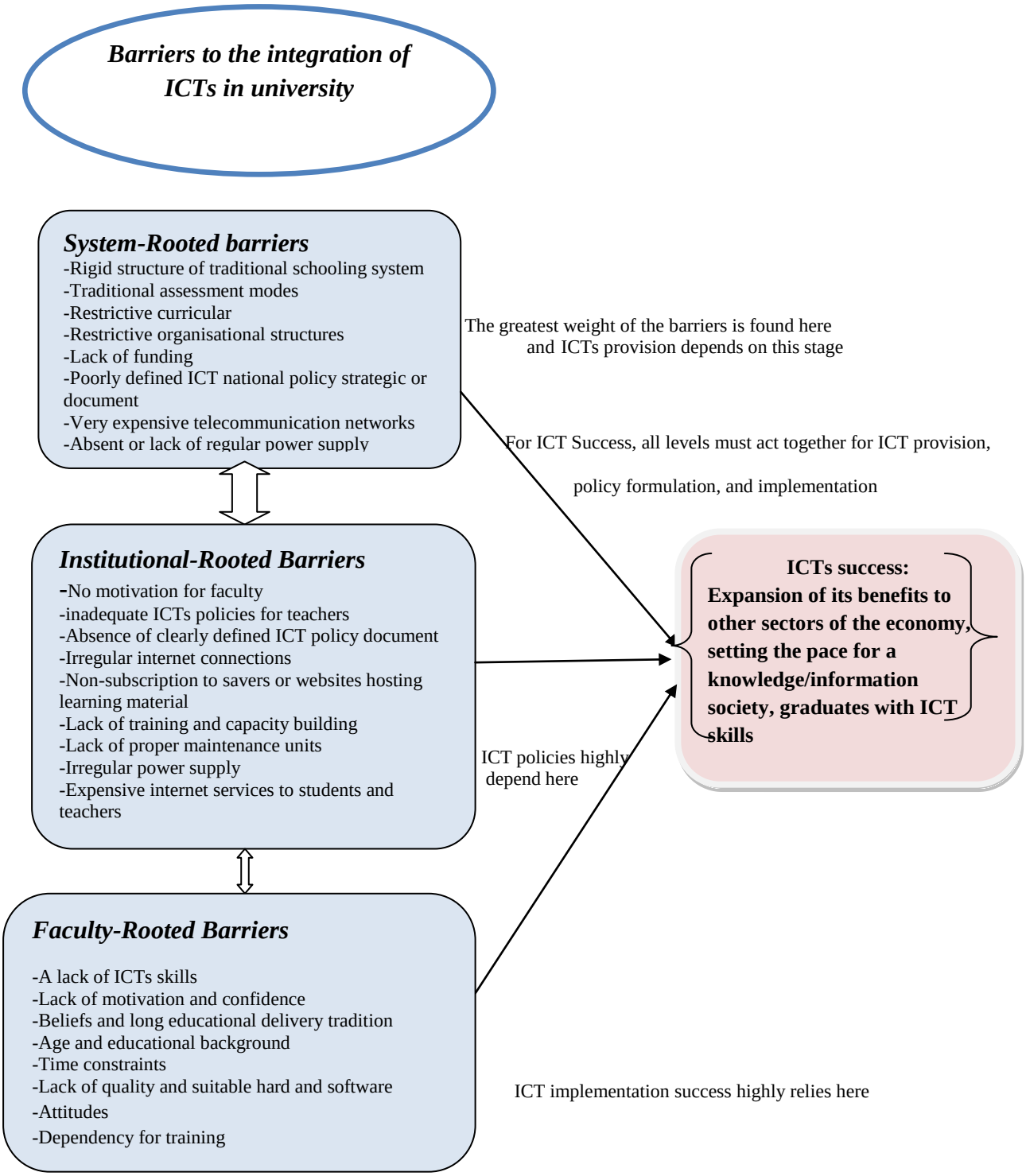
These frameworks are related to Rogers Innovation diffusion model. This author remarked that if technologies were seen as being complex, then this would affect the users who may eventually reject it. The micro-level barriers of Balnaskat et al, (2006) and human factors of Bekele (2009) carried some aspects of users' complexities for example lack of confidence, technology view, and lack of training and skills. At the macro-level barriers and leadership factors, aspects like ICT provision, infrastructure, skills, etc, have been identified. The Innovation Diffusion Model indicated that the decision to adopt or accept an innovation depends on the social system, the communication channel and time. It also depends on the innovation itself-what Bekele (2009) termed technological factors (that is, its characteristics). So if these aspects are not encouraging, the users may reject the innovation or adopt it at a very slow and low rate. This will cause the users to become late adopters of this innovation. Similarly, the factors found in the framework above can possibly lead to a very low and slow rate of ICT uptake leading to rejection in some cases or very late adoption of the devices in

higher education. This also means that the meso and macro-level barriers and the course, pedagogic and technological factors are somewhat alike with the communication channels and the social system of the Innovation Diffusion Model.

All these conceptual framework cited above are relevant to the study. A conceptual framework was developed drawing from, Bekele (2004), Balnaskat et al (2004) and the innovation diffusion model of Rogers (1962) and numerous related literatures. Drawing from all these authors and in relation to the analysed data in this study, a new conceptual framework is developed. The barriers are represented in this study as System-Rooted barriers representing the state, Institutional-Rooted barriers representing barriers of the university, and the Faculty-Rooted barriers representing those barriers at the level of university lecturers.

The first reason for extending these frameworks and framing a new one is that the studies represent the different contextual realities they were conducted and should be compared with what is happening in a third world country like Cameroon for proper validation. For example, the study of Balnaskat and peers is in the UK while Bekele's is in various studies across the world but not in Cameroon. Data collected in most African universities revealed some dissimilarity in relation to the frameworks above. Some aspects are completely absent in these frameworks. Secondly, the classification they have made is not clearly demarcated at the various levels, say faculty, institutional and system levels. Thirdly, the word rooted has been used here to emphasise the gravity that these barriers carry in education and at each level, they are rooted. Fourthly, the barriers that these frameworks (selected for use in this study) carry are not very similar to those found in many developing world and African universities. The idea of ICTs spread rapidly and wider in the developed world earlier than the developing nations. This means that studies conducted in the two may show some contrasting characteristics. The two frameworks above are in institutions that have been existing for at least half a century, and embraced ICTs long before that which this study is carried. Figure 1 below represents the extended conceptual framework for barriers that impede ICTs in teaching.

Figure 1: Stratification of the Barriers to the integration of ICTs in the University of Buea



The figure is an extension of the various conceptual frameworks cited and used in the study. It shows that barriers to ICTs use in teaching are rooted at the level of the teachers, the university itself, and the state in general. The levels of barriers have a double-edge arrow (some with different sizes) in between them showing the relationship of each level to another.. For an ICT success in the academia, each level must off-root its own rooted barriers and the three levels must act together. It is therefore, important that African and Third world universities should consider the various barriers above holistically making every other level to seek for means to overcome its own barriers.

The larger arrow in between the system and institutional level represents the bulk and the most influential of the obstacles. In most Third world universities today, very critical ICT barriers are at the level of the state. For example, Farrel and Shafika (2007:3-4) remarked "A 2006 survey on the state of ICT infrastructure in African universities summed up the situation regarding access to ICT infrastructure as "too little, too expensive, and poorly managed." The country reports confirm this statement for all parts of educational systems (Ibid). Terming them as leadership factors, Bekele (2009: 84) said, "these are administration-related factors that are considered to be crucial nodes in the complex network of success and success factors". It proposed that these substantially affect all the other factors directly and success measures only directly (Ibid). In relation to this study, aspects like funding, power supply, policy documents, and instruments, human resources and capacity building, change of organisational structures, flexible curricular and schooling systems are very crucial in the success of ICTs integration in higher education institutions provided by states.

The large double-edge arrow shows that there is a relationship between the state and the universities. In the framework above, the other levels largely depend on the state or system level for material, financial, human resource and moral motivation. If these are provided, the state will find a positive move towards the information society like the e-governance which some economies are now advocating. On the other hand, if universities do not provide the enabling environment for the use of ICTs by faculty, its vision and mission may be interrupted, and the state may not also be motivated to fund for the affordance of these devices. It is therefore, the role of the state to motivated universities and university lecturers on the integration on ICTs in their teaching, by organising training and devising incentive measures.

At the same time, is the place of the university and the state to encourage, motivate faculty to clear their barriers, and integrate ICTs in teaching since academics are known to be resistant to change owing to their academic tribes, beliefs and cultures as Betcher et al, (2001) reiterated. Ertmer (1999) remarked that extrinsic barriers can be eliminated by ensuring additional resources and providing computer skills and training. While intrinsic ones require challenging one's beliefs and institutionalised routines of one's practices. For universities to do so, the state must also provide what is needed to do so. If these measures are taken, the various levels will off root their barriers leading to an ICT success.

ICT success is defined her as producing graduates with ICTs skills, having lecturers with ICTs skills in teaching, simulation, online delivery, communication and collaboration. It also means being able to demystify the beliefs and attitudes embedded in faculty as far as the use of ICTs is concerned. ICT success will not only be felt at the level of institution but in the entire country since the world is moving from industrial to and information society. This is in line with the view of UNESCO Institute for Statistics (2009:11) that, "Many policy reports have argued that societies are changing from industrial societies into 'information societies', in which the creation and dissemination of knowledge is of paramount importance (ERT, 1997). They contend that, in order to combat social exclusion and to maintain competitiveness in a global economy, education must go beyond the framework of initial schooling in order to prepare and support citizens for lifelong learning (European Commission, 1995; ERT, 1997; PCAST, 1997). Accompanying this argument is the belief that ICT can play an important role in reshaping education to respond to contemporary information society needs. Furthermore, it is believed that ICT in education will reduce the gaps that exist between socioeconomic realities and the outputs of education systems (ERT, 1997)."

Once conceptual and theory frameworks to edge a researcher and his/her are identified, the ideas of others in relation to the topic are very necessary. This gives an idea of what is known about the topic, what has been said or documented about the topic and what was or has been left out or inadequately researched. This guides the research in a starting point and judges his/her rationale for the topic or issue intended to investigate. In the following chapter, we looked at the literature review, make synthesis, and identify its significance to this study.

3 Literature Review

"Once you have identified your research questions, the next step in any research project is to search for existing literature and write a literature review which provides the basis and form an important part of your dissertation" (Bryman 2008, p. 81). After looking at the aim, the context of this study, it is therefore, important to get into a summary of the importance and role of ICTs in higher education basing on the empirical theoretical arguments or works of others. The section deals with literature review and it classes it in the same manner, as it was the theoretical/conceptual framework. The first part deals with views of faculty on ICTs will the second deals with literature on barriers.

3.1 Literature Review on ICTs Views and Actual use

In different societies and institutions, lecturers embrace ICTs in teaching differently. Their perception is on either the nature of ICTs (that is, characteristics) or ICTs functionality, what Fisbbein and Ajzen, 1975; Davis, (1993) called attitudes towards an object and attitude towards the behaviour of the object. The views and perceptions of faculty in the use of ICTs in teaching are mixed with some encouraging it and other discouraging, while others think it should be blended with the traditional way of teaching. For instance, academics and practitioners alike aim to better understand how to choose from among the multitude of possibilities afforded by information technology those particular design features that will contribute most to user acceptance and performance" (e.g. Goslar, 1986; Klein & Beck, 1987; Reimann &Waren, 1985; Davis, 1993: 678).

ICTs in the university are perceived to build capacity and capability as a strategy to sustain the changing international pedagogic needs, enhance program delivery and performance (James, 2008). Lecturer perceived reasons for using eLearning were stated as cost-reduction (68.2%); and managing increased student numbers (18.2%); improved teaching focus and capability (45.4%); and encouragement of student-centred learning (31.8%) (Ibid). However, James noted during his study in Bangkok University that 77.3% lecturers perceived ICTs as being very complex in e-learning and teaching. Their perception stemmed from the fact that they do not have skills and they fear that students may not be adequately trained to handle e-learning requirements.

In the course of designing guidelines for institutional self-assessment of ICT maturity in African Universities, AAU (2009) identified and number of ways that faculty members and universities view ICTs in higher education institutions. These are ICTs used for admissions testing, recruitment and enrolment; students and faculty scheduling, classroom allocations and other schedules; assessments, records keeping and analysis of students performance; placement of graduates and alumni relationship; and purchase of books, food services and other general logistics of community welfare. With these views, ICT integration could be successful. These are however, general views and seem more on the administrative side (looking at these functions deeply) with little attention on the side of the faculty members.

A study carried out by Lindfors (2007) on reflection and perspectives of ICTs by teachers in Europe revealed mixed views of teachers on ICTs in education. This author reiterated that how much or the degree to which students use ICTs in studies depends on the teachers' confidence to use it, and teachers are keys persons who either bring ICTs to teaching or leave it out. This study revealed four ways in which teachers view or perceive ICTs in teaching. These were the value of using ICTs in teaching, ICT competences , pedagogical challenges of ICTs in teaching and the future of ICT use in teaching.

Teachers have mixed views about the values of ICTs in teaching. For example, Lindfors (2007:35) still quotes from data collected that participants said "you can do a lousy job with computers; I think face-to-face is necessary and it is important to find equilibrium between this method and those based on web-learning, the use of ICT gives meaningful experiences to students, etc". They then prefer a blended method. About the ICT competences of teachers, teachers show their attitudes and skills by indicating that students live a virtual society (by being on the internet throughout, sending and receiving SMS, MSN, IRC, etc, while teachers try to cope and start to understand. The pedagogical challenges of using ICT in teaching show two scenarios of morale and academic development. Teachers fear that computer-based learning will help students to plagiarise as well as it will make then learn more. Lastly, ne the future of ICT in pedagogical use students learn more on their own. View of teachers about ICTs are different depending on motivation, social system, and the communication channel that these devices take.

Kwame (2008) also remarked that in a world of competing interests, there is the need for an urgent change in the mode of teaching and research. To him, this is a change that accord African academics the self-confidence in the use of ICTs in the performance of their basic

academic duties. In addition, he noted that the call for national capacity building specifically targeted at human resource development in the area of ICTs in tertiary institutions is long overdue. Such an approach is likely to lead to a fundamental contextual change that will help in dissolving or at least narrow the yawning gulf between higher education in the North and higher education in the South.

This author presents a case in the University of Ghana where though the department of political science has a complete internet connection, some lecturers are unable to send or receive emails. He continuous by indicating that they cannot therefore, benefit from the basic ICTs academic responsibilities like teaching and learning. Here, it is seen that he recognises the fact the ICTs are beneficiary in higher education as he says, " the problem is worse amongst those who were hired long before the ICT revolution." This situation coincides with others in developing countries where, the older generation of lecturers especially those who had their degrees at home do not know and do not have the interest of using ICTs in teaching. In the University of Ghana in this case, some lecturers embarked on the training on how to use ICTs by themselves when they had to visit Northern universities as visiting lecturers. The study concludes that most African universities have a long way to go if they are desirous of upgrading their facilities so as to assure the optimum utilisation of new modes of research, teaching, learning and dissemination of knowledge through ICT.

According to Oliver (2003), the world is rapidly moving into a digital media and information, and the role of ICTs in education is becoming more and more important and this importance will continue to grow and develop in the 21st century. He further asserted that fields of medicines, tourism, travel business, law, banking, engineering, and architecture have greatly changed as compared to the past decades thanks to ICTs. However, education has not been keeping this pace. Still, he says that not long from now, we will soon realised a change in the way education is planned and delivered as a consequence of the opportunities and the affordances of ICTs. The current trends of ICTs in education reveal that the traditional mode of courses build around textbooks, delivery of content for rehearsal will all be affected by different competence and performance through what is learnt? Where? When? and how?

This type of setting will require access to varied information sources, forms and types; information access and inquiry-based student-centred learning settings; problem-centred and teachers as mentor or coaches (Stephenson 2001; Oliver 2003). Teachers wishing to use this type of settings have faced several barriers and contrary to what Oliver says that these barriers

have been eliminated, these barriers are still highly prevailing in the context of Third world universities. Developing world reality is contrary to the situation present by Oliver, which is a reflection of the North, when he says the barriers to the integration of ICTs have changed. It is however, true in this study's context that the costs of using ICTs in teaching is exceptionally higher than presumed and this is acting as an impediment. But, given the importance of these devices in the society and education today, it is essential that universities procure and use them.

Birch and Burnett (2009) conducted a qualitative study about individual, institutional and pedagogical inhibitors to integration of ICTs in e-learning environment in the University of Southern Queensland in Australia (USQ). The study indicates that lecturers and institutions have established international reputation as result of ICTs and about 20% of students in USQ year are non-Australian residents. This has therefore, reduced the cost of printing and distribution of print-based packages. The study reveals that even though ICTs have encouraged some educators to move beyond the traditional face-to-face lesson delivery method, individual, institutional and pedagogical factors still inhibit their success.

Fleonora and Fasano (2004) carried a study on teachers' perception and use of ICTs in two universities in Italy and realised that in-service and pre-service mathematic teachers have different views in the use of ICTs in teaching. In-service teachers think that ICTs are motivating tools enabling students understanding while pre-service teachers do not think that they can bring a great support in creating new knowledge and attracting learning environments. Both however, do not think that they need these devices in teaching and consequently not being able to use ICTs means nothing to them. They however, accepted that ICTs could help students to solve intriguing problems collaboratively. Their perceptions here were based on the ethos of their discipline as these authors concluded.

Similarly, faculty perception of ICTs in higher education can also be linked to socio-cultural context in which the individual is working, as Shelton (2006) says, in describing the differences in lecturers' beliefs and the potential implications of ICTs, we need to take account of the social and cultural context within which these individuals are working. University teaching might be understood as operating within multiple cultures that interact dynamically (Trowler, 2008). In particular, individual lecturers operate within departmental, institutional and subject disciplinary spheres and each of these can potentially influence the individual's practice with technology (Ibid).

3.2 Barriers to integration of ICTs in teaching

Numerous barriers impede successful integration of ICTs in teaching. These are individual, institutional, national or technological. The following part deals with literature review on this.

In the study of Birch and Burnett (2009) in USQ academics were asked about their use of, and attitudes toward educational technology and what they perceived to be the motivations, enablers and inhibitors associated with the development of e-learning environments. Consequently, the institutional barriers identified here are a lack of academic leadership, clear vision and formal strategic planning, and the absence of clear institutional policies, processes and standards (Maguire, 2005; McLean, 2005; Surry, Ensminger & Haab, 2005; Birch and Burnett, 2009). Individual barriers uncovered are time and heavy workload on lecturers while pedagogical barriers are lack of well-fitted course designs. These authors indicate that interviewees complained of a lack of clear e-learning course design, strategic plans, policies, procedures, and processes.

Looking at this study critically, one sees that it brings out the barriers of ICTs in teaching in an e-learning setting. The study is however, not explicit in explanation of the issues raised or asked to their respondents. Views and perceptions are not actually clearly brought here. Secondly, from the look of things one is tempted to believe that study knew the results of this topic in USQ before carrying out investigation. The reason here is the pre-selection of the types of respondents for example “adopters, non-adopters and pioneers. There are ICTs users who may not necessarily be in the school setting, but at home or different places or instructions.

Cook *et al*. (2008), assessed two studies conducted prior to and after 2003 on motivators and inhibitors of university faculty in distance and e-learning in the United States of America. The assessment of the study conducted before 2002 revealed that in the university, faculty are intrinsically motivated to participate in ICTs related teaching in order to help students achieve their education, but extrinsically motivated to meet their psychological needs through incentives like salary increment, course releases and technology support derived from teaching e-learning and distance education courses. While the study conducted after, revealed that extrinsic motivation plays an important role in faculty participation in distance education. The study makes it clear that studies point to faculty as a key component in the growth and unprecedented success of distance education.

Even though there are intrinsic and extrinsic motivations in this study, a number of factors still impede faculty complete engagement of ICTs in education. These factors include time, lack of institutional technical support, heavy workloads, course quality, access, and training, lack of grants for material and expenses, and lack of merit pay. The study concludes that, even though faculty members were inherently committed to helping students, they wanted the university administration to meet their basic needs through intrinsic and extrinsic motivators like salaries increases and course releases.

The assessment deals with ICTs in teaching but mostly on distance education and e learning. It is important in this study because it unveils the barriers to ICTs in education. As has been the case with most studies, it is carried in the US, a developed world context. A similar study needs to be conducted in the developing country in order to validate or generalise the findings. It is also important to note that a different situation may be if the same evaluation is made in a blended learning environment.

In 1999, the United Nations Economic Commission for Africa held the first Africa Economic Forum under the theme Challenge to Africa of Globalisation and the Information Age. It realised that the continent's higher education institutions were plagued by external, internal and human obstacles to the integration of ICTs in education. External obstacles (out of the universities) were: poor national telecommunication infrastructures, high costs of ICTs and higher import tariffs, inadequate and irregular ICT provision, and funding initiatives, absence of well-defined national ICT policy documents, unreliable electricity and limited Internet bandwidth, high license fees for new entrants, slow licensing procedures and high call charges. The internal obstacles were poor self-organisation awareness and response to change, poor maintenance, incoherent and insufficient ICT policies, poor motivation for use and low ICT prioritisation by leadership in terms of development and application. Human obstacles like lack of training and human support staff, lack of motivation, lack of ICT systematic plans for integration in teaching and institutions' inability to retain experts due to low pay packages. This commission however, concentrated only in some countries and there is need for a wider observation.

Fulton *et al.* (2004) looked at teacher education and planning guide and proposed that even though ICTs can be powerful tools in students learning, their value depends on teachers in fusing them to support instructions. Without a strong foundation in the knowledge and skills for using technology effectively, teacher candidates entering today's schools will fall short of

meeting the "highly qualified teacher" expectations set out by the No Child Left Behind (NCLB) Act (2002)" (Fulton *et al.*, 2004). It also reiterated that it is important for leadership to make it compulsory for new teachers to graduate from teacher programmes with ICT knowledge and skills so that they will be able to integrate technology easily and effectively into their daily teaching, in whatever setting they may find themselves. This shows the importance attached to ICTs in today's education. However, even with such compulsory employment requirement, those recruited must have to update themselves with the new powerful and complicated ICTs.

These types of preconditions for recruitment of faculty is only possible in developed country context where the ICTs are available and accessible, are taught and students are being taught using them. In order to affirm this, several studies need to be considered in different places, including the attitudes of faculty in integrating the devices in teaching in different settings. In third world countries, it is possible for a teacher to go through his/her training course without using or being taught using ICTs. So the precondition set above may not be a right one for these kinds of situations.

Barry *et al*, (2007), conducted a similar study on the underutilization of information and communication technology-assisted collaborative project-based learning among international educators in Eastern Europe, Africa and North America and identified several barriers. These were miscellaneous, lack of ICT-related projects, lack of ICT support, unreliable Internet connections, lack of teacher training, nature of curriculum and programs and lack of ICT technical support. These are very similar to those identified by Balnaskat et al. (2006), Ertmer (1999), Pelgrum (2001), Ely 1989, and Bekele (2009). This study showed that lack of training and high cost of Internet connections were the main inhibiting factors/barriers in Africa, while the other factors were slightly significant in all these cases.

It is a general risk of large-scale innovations that educational designers develop a design or blueprint for a powerful learning environment that teachers subsequently do not or cannot fully implement in their teaching" (Könings *et al*, 2007). These authors look at teachers' perspectives on innovations and implications for educational design in Holland. They realised that teachers perceive of larger class sizes, time, student characteristics, students lack of passion, teachers lack of technological skills, willingness to learn, lack of consciousness of teaching behaviour, incomplete reflection, and dominant conceptions of teaching and learning

as being the causes of this. However, this is a developed world context, and a single case study.

Otero *et al*. (2005) looked at integrating technology into teacher education and emphasized that technology continue to be very important to support and influence education as we move from an industrial to an information-based society. They added that teachers therefore, must be skilled in technology application and knowledge, using it to support instructions and to enhance and extend student learning. This is very essential because apart from benefiting the teachers, it will improve student achievement, promote student learning, and provide them with the skills needed in their future education and workplaces. A similar study by Hooper and Rieber (1995), revealed that teacher's integration of technology in classroom evolve through stages. Here, the teacher needs to familiarise himself with the technology, use it, integrate it in teaching, is reoriented and then he evolves to become a full technology integrator in instructional education. They termed these stages as familiarisation, utilization, integration, reorientation and evolution phases of technology integration by teachers in classroom. This, they say will change the traditional perspective of educational focuses on either the technology itself of teacher's instruction which is limited to just knowing and using ICTs to contemporary perspective of education technology focuses on a learner's active construction of knowledge that can reach all. This is somewhat related to the factors that determine the adoption of an innovation as indicated by Rogers (1983).

Technological advancements, global telecommunication, and automation have greatly contributed to economic growth in the world over the past fifteen years (Rena, 2008). In the past, the tradition has been teachers planning and leading students through a series of instructional sequences to achieve a desired learning outcome. This tradition is changing and will continue to change. Indeed, ICTs have been identified in many spheres of life including higher education, as driver and enablers for economic development. ICTs is a force that has changed many aspects of the way in which we live (Oliver, 2003).

It appears paradoxical that higher education institutions do not have ICT strategies (Bekele, 2004). In a study commissioned by the Dutch Ministry of Education, Culture and Science in 1998 on the use of ICTs in higher education in The Netherlands, UK, Finland, Belgium, Australia and USA, Wende and Beerkens (1998) stated that it is good to ask "What is the situation in our own country as compared to that of another country. The study found out that most higher education institutions in Europe do not yet have an elaborate and coherent

institutional policy concerning the role and use of ICTs in higher education. That the role of ICT in education is impressive but many of these general activities are disconnected from the institutional framework in which they are occurring. These policies according to these authors, are needed in universities and other higher education institutions today for the positioning of universities in the marketplace, to accelerate growth in demand by students and staff for access to educational technologies, to increase the acceptance of learner-centred (self-pace, self-directed) and more social interaction and communication settings and to improve efficiency/effectiveness of students. It also proposed that governments have to reconsider their roles and responsibilities in this area and, whether and how they should stimulate the initiative of ICT in higher education. This study is in common with Oliver's (2003) view that the cost of technology- related programs is so high and that many in the academia are still reluctant to use ICTs delivering their matter to students, due to lack of knowledge and skills. It is however, of importance to note that the northern universities have embraced the ICT revolution more than their southern counterparts as Kwame (2008) says some lecturers are not able to even send or receive emails.

In the Netherlands, Australia, the US, Belgium and Finland, Wende and Beerkens (1998) noticed this. In Djibouti, Hare (2007) voiced out this and in 2006, Agbanlahor realised this in Nigeria. Looking at the "ICT Policies and Strategies in Higher Education in South Africa: National and Institutional Pathways", Cross and Adam (2007) realised that even though South Africa has gone a long way in adopting an exemplary approach to adoption of ICTs in schools, it lacks a national policy framework concerning the role of ICTs higher education. These authors add that, this has made institutions to rely on a series of incoherent and fragmented statements scattered through several policy documents in higher education to make institutional choices aligned with national concerns. The study also indicates that given the diversity of national, institutional and international levels, institutions have opted for varied pathways in their effort to integrate ICTs in their curriculum design, delivery and research.

Apart from the effects of lack of clearly defined ICTs policy document and instruments, local contextual complexities also hinder their integration in higher education institutions. While the literature indicates that policy and implementation trends throughout the world tend to respond to global drivers (knowledge economy and ICT) at the expense of national and institutional interests (Kishun, 1998), the South African experience shows that how South

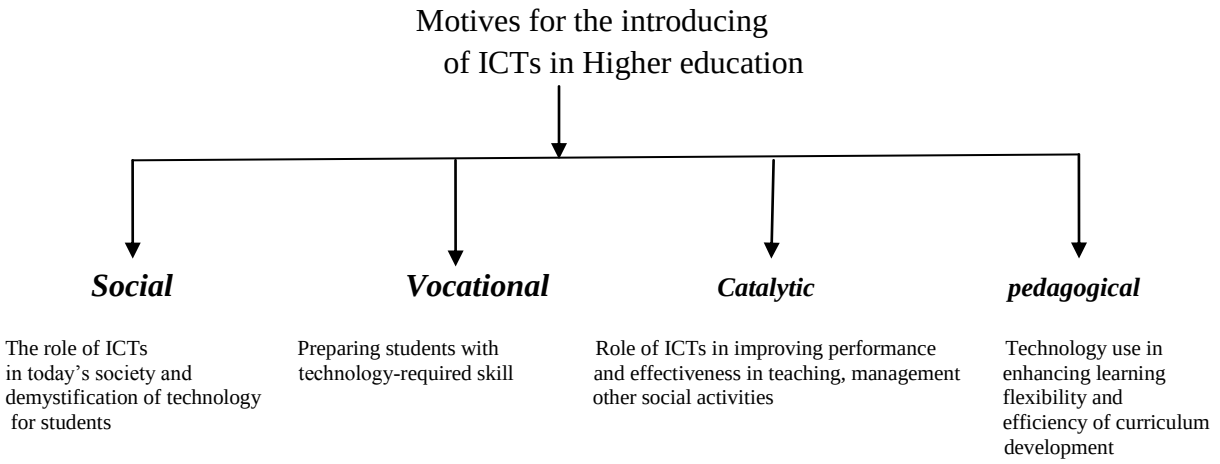
African institutions have responded to these drivers reflecting local contextual complexities (Cross and Adam, 2007). They also noticed that after Apartheid in South Africa in the 1990s, the National Commission on Higher Education (NCHE) issued out a number of reforms to readjust higher education system to suit equal access and equity. It has as three main objectives: increased participation, greater responsiveness and increased cooperation and partnership. The place of ICTs here was blurredly defined as it was the case in others as these authors say "while the White Paper emphasizes increased participation in higher education as a major policy goal, no reference is made about the use of ICTs as a possible resource to expand access and analysis of key policy. While ICT has received, significant attention from the South African government at number of policy levels and reflect ICT Policies and Strategies in Higher Education in South Africa, ICT policy in higher education does not have the same thrust (see e.g. Gillwald, 2001, 177; Cross and Adam, 2007).

The higher education department in south Africa in charge of providing framework for achieving the White paper's vision, approaches ICT with scepticism particularly in the context of addressing problems faced by the disadvantaged students. The authors draw from this that this will have electronic negative impacts on internationalisation and e-learning of markets and poor integration of ICT in teaching and learning.

The document however, alerts that the importance of ICT in higher education presents opportunities and threats depending on the views of policy makers. This is similar to what Wende and Beerkens (1998) realise in the West. Opportunities are viewed in terms of their social benefits and the enrichment and enhancement of the curriculum and the efficiency and flexibility of learning processes. Taking this into consideration, the motive of introducing ICTs in higher education is regarded as being vocation, social catalytic and pedagogical as can be seen in the model below drawn from Keogh (2001) and (Cross and Adam, 2007)

There are therefore several reasons for the introduction of ICTs in higher education as has been seen above. As can be seen on figure 2 below, when the introduction of ICTs in higher education is socially motivated, it is expected that this will demystify the myth of technology in today's society. When the is pedagogical, the expectation is that it will help to enhance learning flexibility and efficiency of curriculum development. In a vocational motivation, it will help to train graduated with technology-related skills and in terms of catalytic motives, ICTs have a role to improving performance and efficiency in teaching, management and other social activities.

Figure 2: Motives for introducing ICTs in higher education



Source: Developed from motives advanced by Keogh (2001) and Cross and Adam (2007)

Looking at the challenges of ICTs in learning and teaching in Nigerian universities, Aguele (2007) asserted that these devices are more essential in all universities but their penetration into those of developing nations and Africa has been very slow. The reason here is that some nations have developed ICT policies but some have not done so yet. While some governments have produced national policies on ICTs, many are yet to do so (PHEA 2007a; Aguele, 2007). Going beyond Nigeria, the study shows that countries like Ghana, Mozambique, Uganda and Tanzania are able to have home pages in their universities describing courses, faculties and admission procedures. The explosion of the WWW has made educationist to rethink about the teaching learning-transaction modes and settings. The only possible solution to mass higher education is to resort to distance education and ICT-based learning, provided such technologies are properly mastered and necessary investments made in hardware and software as well as in human skill and training (Loing, 2005; Aguele, 2007). According to these authors, ICT has opened opportunities for access to education for those unable to attend school or college for economic or cultural reasons. This is why universities according to him are challenged to integrate those technologies into their strategies, their organisation and their educational processes. In the developing countries, particularly Africa, this may not be the case. Notwithstanding assistance from some donor agencies, the issue of hardware and bandwidth provision still remains hard nuts to crack. ICT can enhance effective teaching, learning and research (Ibid).

This argument seems true but contextual because instead in developing countries access to ICTs is instead very expensive. It may be possible in Northing or developed countries where

web access are sometimes offered to students and faculty free of charge. Similar to the case presented by the Wende and Beerkens (1998), Aguele notes that universities confront external and internal problems implementing ICT because many governments in Africa have no national ICT policies and plans causing universities to do their best at their level without any central coordinating document as Cross and Adam (2007) noted in South Africa. This is because African governments carve the regulatory framework in which universities operate as (Luboobi 2007; Aguele, 2007) remarked that the regulatory frameworks for the telecommunications, ICT and intellectual property rights are still restrictive in most African countries. Hare (2007) also specified that the government of Djibouti is still yet to develop a sector-specific ICT policy for education. Universities in Africa face the problem of expensive bandwidth, as it is the case in Nigerian.

Inside the university Aguele (2007) specified that integration of ICTs is sometimes very difficulties because the decision-makers academics themselves are so reluctant to change curricular and pedagogical approaches. The lack of incentives, lack of material and human resources, lack of funding are some of the problems of ICT within the university. Being a case study in the third world this review may reflects the study at hand, though barriers are not similar all through.

In Djibouti according to Hare (2007), the government has identified ICTs as a critical tool for access into education, but she is yet to develop a sector-specific ICT policy for education. It however, shows that the ministry has made capacity building for teachers a priority. Access and funding as it is the case in entire African education plagues ICT use in education in Djibouti.

At the same time, ICT continue to impact on all aspects of contemporary education, requiring higher education institutions and stakeholders to be linked to each other through an advanced network that is connected to the rest of the world (Ayoo, 2009). Of particular interest now is the way in which African universities bring the region in touch with what can be referred to as the global village of higher education, and how universities bring Africa to the attention of the world (Ibid). This author notifies that higher education institutions are not more confined within their national or regional frames but are becoming international in nature with their driver being ICTs. The role of ICT in higher education is varied from teaching, learning, research to internationalisation. Higher education institutions are global actors in their own right (Marginson and van der Wende, 2007), and the role of ICT in the existing university

ranking models is increasingly important (Ayoo, 2009). This is emphasising the extra ordinary role of ICTs in higher education institutions.

"Even though there is exist a number of computers in the university today, they are not fully used so that the intended ICT benefits by universities be obtained" (Hopkins, 1996; Bondaryk, 1998; Agbonlahor, 2006.p. 263). In this study carried out on the motivation for use of information technology by faculty in Nigeria, Agbonlahor (2006) showed that the role of a tool in an organisation is realised when the intended users actually use it and that this depends on the instructor's awareness, willingness, and ability to use the tool or technology. She also looked at the characteristics of ICT use and the factors influencing ICT use among university lecturers. In order to integrate IT into their curriculum, lecturers (faculty members) are an important group of users who play a vital role in the successful implementation of new information technologies (Ibid). The integration of ICTs in universities does not depend on their availability and access but on the perceptions and the way in which students and staff embrace them, even though academics are resistance to change. This author and others noted that, the ICT studies using the innovation diffusion model have considered individual characteristics, attitudes and perceptions, as well as other theory elements such as social norms, communication channels, opinion leaders, technology champions, the time factor, and the characteristics of the technology being implemented.

She further remarked that in order to get ICTs integrated into the university, it is very essential to diagnose the difficulties faced by lecturers for the effective use of these devices since it has been the challenge of many universities getting ICTs into the hands of faculty. Since many universities in Africa operate under very strict, meagre and tight budget situations, it also of importance that any little available resources earmarked for ICTs are properly used, address the needs of faculty, and directed to the intended end-users. The study showed that users tend to perceive the use of an an innovation or system when it is physically accessible and access happens to be the most outstanding barriers to the use of ICTs in higher education institutions particularly in developing countries.

The lack of training affects their attitudes, abilities and desires to integrate information technology into the university classroom (Gilmore 1998; Agbonlahor, 2006). University lecturers who have an efficient continuous ICT training have a higher desire to use the devices in their teaching. The study also indicates that existing literature about ICTs in the universities hardly touch the actual use by the rest of the university community but, the

library, and that is what her study looked and this will be looking at, even though she bases her study on the motivations of faculty. In this study at the University of Buea, nothing in the form of literature exists in ICTs in universities especially on the part of teachers. The only few articles that exists on this focus on students and the use of ICTs in learning.

The attitude of faculty members towards ICTs can be motivated by training and provision of the devices to them. Faculty members are highly likely to have a higher desire for use of ICTs when they constantly use them. Dowu (1997) undertook a study to examine the use of computerized information systems in Nigerian university and research institute libraries and noticed that librarians who use computers on daily basis had a very high attitude towards the use of computers. The study showed that age and longevity of service, gender, and type of libraries did not portray significant influence on lecturers' attitudes than consistency of usage. This is however, different from the situation in the University of Buea because the study is not based in libraries. Relatively, studying the impact of ICTs in scholarly publications by science teachers in Ibadan university in Nigeria, Sangowusi (2003), noticed that although 72% of lecturers were computer literate, only 35.5% person have been using computers for over five years and only 32.8% had personal computers.

Banu and Banu (2010) remarked that new ICTs have revolutionised the field of education because communication is the only possible basic means of successful interaction between students and teachers, between institutions, between peers and between governments. Further, they say that about 87% of information gets to our brain through the eyes, 9% through the ears the rest 4% through other senses. Therefore, visual aids are gaining more attention in teaching than verbal teaching. Still, they say that many academics strongly feel that ICTs are valuable tools to overcome illiteracy as the demand for computer technology continues to enhance training institutes and organisations. They concluded by saying that the new ICTs will continue in future to influence and change the traditional styles of teaching and learning, and dissemination of knowledge and information. This is a very essential in indicating the role ICTs now have in education requiring countries and institutions to revisit their systems of education. However, the study in relation to this study does not bring out the difficulties (barriers) that lecturers face or will face with these new ICTs in teaching. This one of the main aims of this study in the purely developing world context since their study and a bulk of literature about this topic is on developed countries.

Learning is supposed to be a life process especially with the kinds of labour market demands today. ICTs according to Keogh (2001), have changed the landscape of higher education by, changing the nature of their student body to include working students, as well as students from across the globe since they can now study when and where they prefer. He further says, they provide lifelong learning opportunities to those currently excluded from learning, those residing in remote areas, disabled and the disadvantaged groups. ICTs act as a catalyst to massification of higher education by providing opportunities for a variety of public and private institutions to offer education programs through the internet. Following the prevailing nature of world affairs and cultures, it is important for higher education institutions in third world countries to realise that ICTs have a significant impact on higher education delivery in terms of new knowledge conception, production and delivery. This is why Keogh holds that ICTs have the ability to offer new ways of flexible, custom-based education available to anybody, anywhere and anytime and pave the way for different kinds of learning environments.

He points out that for this to be realised, governments should provide the funding and the resources required, give time and take responsibility for decision making and implementation strategies and finally, there should be a policy of integrated support services including teacher and technician training, curriculum and assessment, together with hardware and software provision (Walker, 1989; Keogh, 2001). He warns that in systems with centralised national policies like France (which Cameroon is a replica), ICTs policies must be carefully looked upon. While citing some cases across Europe, he notes that the government of Ireland has realised the importance of education in economic development in general and the role of ICTs in the achievement of this education. On this note, the government has provided lump sums for training, infrastructure and funding of the use of ICTs at all (primary, secondary and tertiary) levels of education. In Portugal, government has raised the awareness of the importance of ICTs in education to students and teachers. Through the Nonio program the, state offered training, resources and encouraged bottom-up suggestions and strategies in education and ICTs policies.

Similar contextual detailed situations have taken place in Finland, Australia, the UK, the USA, Canada, Pakistan, Japan and even in Africa. Africa is however, is noted for underdevelopment, poverty and uneven availability of technology, even the traditional educational facilities are absent and inadequate. He however, concludes that funding and

access are very crucial for ICTs in African education but the situation in terms of awareness and infrastructure is improving.

With the low level of ICT initiatives and usage in Cameroon higher education institutions, it is realised that very little has been researched upon on this topic. The western scenarios are therefore, very different in the context of this study and are not a representation of the Cameroonian reality. The reviewed literature therefore helped to situate Cameroon in the debate about ICTs use in higher education.

In all research studies and this qualitative research in particular, particular methodologies are required to examine phenomena, their characteristics and their impact on the context they operate or the implication they have for their immediate environments and beyond. These help to edge researchers and their findings, and interpretation of these findings in a scientific manner for better understanding. The following section looks at the methodology that was used to carry out this study.

4 Research Methodology

Research is not just a process of gathering material, as it may sometimes suggest. Rather, it is about answering unanswered questions or creating that which does not currently exist. It is systematic as it is planned and organised has specific goal (Wayne and Stuart 2007). Research methodology determines the validity of the study in question and therefore a study must be well detailed as far as the methodology is concerned. This section therefore, gives details of the method that was used to conduct this study.

4.1 Research design, choice of topic and study site

"A research design is a framework for collection and analysis of data" (Bryman, 2008: 31). Each research design depends on the type of investigation to be carried. According to Trochim (2006), it can be thought of as glue that holds all of the elements in a research project together. These elements are observation, treatment, groups, assignment to groups and time. Sridhar (2008) identified a number of research design examples, which include experimental research design, case study design, longitudinal research, and a cross-sectional design. A research design is different from a research method which is simply a technique for data collection (Bryman, 2008). To this author still, it could also extend to involve a survey, an evaluation, and a comparative design. A research design can also be descriptive (asking how) or explanatory (answering the question why). This study mixes the two but much more explanatory.

The research design here is a case study. A case study refers to an intensive detailed examination of or in a particular setting (Bryman, 2008). A choice of research design reflects decisions about the priority being given to a range of dimensions (causal relation between variables, generalisation of results, understanding behaviour and meaning of a specific context and having a temporal appreciation of phenomena and their connections) of the research process (Ibid). A case study was chosen for this study because the scope of literature about the barriers, views and perception and actual use of ICTs by faculty members in education in general and higher education in Africa in particular is narrow and much more generalised. More so, very limited empirical studies exist about this topic in developing countries and, nothing existing about it at the University of Buea. Much about the topic depicts the situation in the western world and this is mostly in pre-university studies.

Therefore, a detailed empirical study about this topic in a developing world context is needed and this topic builds on that.

The University of Buea was chosen as the study site due to a number of factors. The first one is that the University of Buea has established a University Strategic Plan that runs from 2007-2015, and in this plan, ICTs have been one of the focal points. It has longed for 100% bandwidth internet connectivity in the entire institutions by 2008. Secondly, the University of Yaoundé I (the first/oldest and flagship university in Cameroon) was initially chosen because as Njeuma et al. (1999) state that, the University of Yaoundé I is the only university in Cameroon with a modern computer centre. But, this choice was changed in the course of time because 80 to 90% of its activities (both teacher and student related) are in the French language. This means that almost all information, interviews, and interactions were mostly going to be conducted in the French language and then translated to the English language which is the only acceptable language of instruction for this program. This could take a very long time in translation and transcription of interview records and other documentaries, Buea University being the only Anglo-Saxon university stood a better chance for selection.

The Faculty of education was chosen because it is believed to have a knowledge of present education demands like the one this study is based on. Initially, the Faculty of Education alone was chosen and while on the field, data collected could not successfully answer the research questions. The supervisors were therefore contact and their proposal was to ignore it and take a different Faculty or consider two factors. The second option of including another Faculty was considered.

4.2 Research strategy

Research strategy deals with qualitative and quantitative research. Even though a clear line of differentiation between the two is blurt, the two are not the same. Qualitative research deals with attributes while quantitative study deals with measurements or quantifications. These strategies are different in their ways to collection, analysis, and representation of findings. Some research methods concerned with qualitative research are ethnography, qualitative interviewing, and focus groups. While those of quantitative are, questionnaires, and surveys.

According to Bryman (2008), in qualitative research, theory orientation is inductive but deductive in quantitative design, epistemologically and ontologically in the former is based on

positivism and objectivism while the latter is on interpretivism and constructionism. This means that in qualitative research, a theory is generated from a conducted study, while in quantitative study; research instead takes an existing theory as its starting point. While epistemologically, qualitative research tries to understand the social way world by interpreting activities of people on earth, but with quantitative studies, research adopts nature the way it is. On the side of ontology, qualitative research describes and constructs phenomena by establishing relationships and causality, but quantitative research see them are they are in separate entities. Qualitative design is however, accused of being too subjective, difficult to replicate, suffer from over or under generalisation and lacks transparency (Bryman, 2008)

Even though they are different both have as aim of reducing data, responding to research questions, relating data analysis to literature, appropriateness to research and conscious about variation.

The research strategy used in this study was a qualitative method because the types of research questions posed needed the use of a qualitative research method. Sridhar (2008) argued that case studies are often seen as prime examples of qualitative reasoning-which adopts an interpretative approach to data, studies things with their context and consider the subjective meaning that people bring to their situations. These questions deal with views, actual use, barriers and conceptions of faculty members in the integration of ICTs in higher education institutions. This method was therefore, chosen in order to contribute knowledge to the topic qualitatively.

4.3 Data collection method and participants selection

The research questions raised could not be successfully answered without the use of research instruments like interviews, documentaries, and internet sources. Data collection of this study was both from primary and secondary sources. Primary source of data collection was face-to-face interviews with lecturers of the two Faculties, with the help of an interview guide (Appendix A) .While the secondary sources like the Internet sources and documentaries were used to obtain existing literature about the topic and analysis of the field-collected data.

According to Bryman (2008), secondary analysis offers numerous benefits to students carrying out a research project. These benefits include time and cost maximisation, high

quality data, a chance for longitudinal analysis and cross-cultural analysis, etc. However, this sources could still be unfamiliar, have complex data, some with poor quality and lack of key variables. Numerous literatures were reviewed. These literature included reports- midterm reports, evaluation reports, and publications of international organisations and donor agencies like the World Bank, UN, UNESCO, IMF and AAU; University of Buea's 2007-2015 Strategic plan and contents of the various aspects on its university webpage. Most of these documents were on ICTs in education in general with some specifying its role in higher education.

The interviews were conducted in the two Faculties (Education and Health Sciences) of the University of Buea. The interviews were audio recorded and in each case, the researcher first prepared and distributed informed consent forms to participants in which the two parties agreed on a number of ethical and privacy issues before the interviewing exercise began. Audio recording allows for a more thorough examination of what people say about the world (Heritage, 1984, Bryman 2008: 451). An interview guide was used with all participants asked the same or similar questions to ensure consistency and avoid wrongly posed questions. Probes in some incidences were however, not the same depending on the responses some of the participants gave. Participants were interviewed in their offices during the appointed time they deemed necessary. The interviews had an average duration of 20 minutes.

Convenient and purposeful sample techniques were used because questions raised were design to be addressed only by university lecturers of the chosen Faculties, the deans, and IT department. Participants selected were those found on campus at the time the research was being conducted, that is, those who were available. The reason for this was that lecturers are too few and those whom we stumbled upon, were selected for the interviews. This institution has more than 15000 students with only 289 permanent teaching staff. Again, the study was carried out at the end of the first semester when some lecturers had lectured and gone or still to come in the following semester. This therefore justifies the mode in which participants were selected.

The Faculty of Education has three departments and two lecturers were interview from each of these departments, together with the Dean. This included two females and six males, ages ranging from 41 to 61 years. In the Faculty of Health Sciences, two lecturers each from four of the five departments were interviewed making these eight in number. In term of sex there were three females and five males lecturers. The Dean of this faculty could was not reached.

The head of the university Information and Technology (IT) Centre was interviewed, while the unit in charge of Teaching, Professionalization and the Development of Information and Communication technologies refused to release any information whether by interviews or any sort. However, the time for the study was not enough since evaluations were going on at the university campus. After returning from the fieldwork, numerous contacts were been made with the university for some clarifications and completion of insufficient data. This has been so particular with the IT department through email correspondences.

Data analysis was then done with the guidance of the research questions raised and the theoretical frameworks identified to be relevant for the study. Analysis of data in this study mixes explanation and description quoting from responses in the field and relating to reviewed literature. This data was presenting and analysed, grouping responses according to the levels of ICTs penetration identified by Balnaskat et at (2006), Bekele (2009) and those found in the field. After returning on the field, the audio-recorded interviews were transcribed into passages and tables. This was grouped according to the research questions and the questions that were constituted in the interview guide. Consequently, the analysis of data is presented in the same other as research questions. This process took a long time but was fully explored. Data presentation also followed these groups and subgroups. The data was then interpreted and given interpretative subtitles and titles, some purely emerging from the data and some adapted from the conceptual/theoretical frameworks.

When a research study is properly designed, with all the necessary details of each stage and plan, data collection becomes easy. Successful data collection and good scientific analysis produces a reliable and valid study that can be generalised or replicated. The following section dwells on the reliability and validity of the study

4.4 Reliability

According to Bryman (2008), reliability is the consistency of a measure of concept. Reliability in research is concerned with whether the results gotten are repeatable or reliable. However, reliability is mainly concerned with quantitative studies. Golafshani (2003: 601) remarked that “If a qualitative study is discussed with reliability as a criterion, the consequence is rather that the study is no good”. Qualitative researchers however, have a different view for example, Patton (2001) states that validity and reliability are two factors,

which any qualitative researcher should be concerned about while designing a study, analysing results and judging the quality of the study. This means that the concept also has a role in the consistency of a qualitative research. Reliability in qualitative research is therefore, dependability of data and results as Campbell 1996; Golafshina, 2003:601 concluded that "the consistency of data will be achieved when the steps of the research are verified through examination of such items as raw data, data reduction products, and process notes".

This study was conducted in two Faculties. The results are responses of those who were available on campus during that semester. This reflects the views of lecturers in the University of Buea. On a contextual setting of this study site, the results are reliable but needs to be much more consistent when other research methods are used, for example triangulation of sample size and frame for data collection and analysis. The raw data was analysed and reduced and the product represents the reality in the study site. In addition, documentaries and internet sources were consulted and the results were not too different. Participants also gave similar responses, meaning that the results are consistent. It is worth mentioning that some units of the institution refused releasing information, so proper examinations of the study with all units collaborating will make the results much more consistent.

4.5 Validity

It is the praiseworthiness of a research study and it is concerned with whether the results reflect the reality. Drawing from Bryman (2008: 32), it can be internal, measurement, external and ecological. It refers to whether the research is observes, identifies, or measures what he intended to measure (Mason, 1996:24; Bryman, 2008). In qualitative research, it means the high degree of match between the researcher's observation and theoretical issues they develop. Empirical concusions can then be made. Validity is evident in this study because the research questions on views, actual use and barriers intended to be answered qualitatively are appropriately answered. Participants were selected from different departments of the two Faculties and they give similar responses, meaning that study is valid.

4.6 Ethical issues

Any research study is carried in a setting that has its own common values, cultures, beliefs, population, and identities. " The statement of ethical practice enjoins researchers to anticipate,

and to guard against, consequences for research participants which can be predicted to be harmful and to consider carefully the possibility that the research experience may be a disturbing one" (Bryman 2008). In order to guard against such consequences, a number of ethical issues were taken into consideration in the course of this study. Firstly, the University of Oslo issued a letter (Appendix C) to the University of Buea presenting the researcher and asking for assistance in the conduction of fieldwork. This letter was presented to the deputy vice chancellor in charge of research, cooperation, and relations with the external world University of Buea, who in turn issued a letter of authorisation to conduct research at the University of Buea (Appendix D). Another letter (Appendix E) of assistance introducing the researcher to the Deans to conduct research in the Faculties and requesting them for help accompanied this letter.

Secondly, an informed consent form (Appendix F) was issued stating the rights and obligations of the researcher and the participants, which was carefully read and signed by the two parties before any interview started. The research respected the norms of the University of Buea and participants were told that they had as a right to participate or not. Participants were also told the purpose of the study, and that electronic recorder will be used and assured that a copy of the thesis will be sent to the institution. They were allowed to choose to accept the recording device or not.

Thirdly, the study scientifically recognised and acknowledged all authors of the literature consulted in order to avoid bootlegging.

4.7 Limitations of the study

The study encountered a number of limitations. The first one was the less time frame available for the study. The researcher had less than three months after fieldwork to transcribe and do the complete write up and submission. In addition, some sources in the field refused to release information of any sort while some departments in the faculty of education had no lecturer available for interview. This therefore, hampers the total reliability and credibility of the study.

4.8 Some Operational Definitions

- **Definition of ICTs**: according to AAU (2009), Information and communication technologies (ICTS) are devised set of technological tools and resources for creating, storing, managing, and communicating Information. The new digital Information and communication technologies are combinations of hardware and software, multimedia and delivery systems. They exist as common items that include desktops, notebooks, laptops, televisions, digital cameras, local area networks, intranet, the internet, worldwide web (www), and CD-ROMs. Their applications include word processing, spreadsheets, tutorials, simulations, electronics mails, digital libraries, computer-aided designs, computer-mediated conferencing, and videoconferencing.

- **ICT integration**: "Is the situation where computers and the Internet are used in combination with the traditional culture of university learning and teaching like the lecture method. It simply implies that the traditional lecture method and other classroom conditions are supported and/or facilitated by such forms of technologies and does not describe here the condition where such technologies replace existing classroom ways of learning and teaching" (Bekele, 2004: 18). It is a blend of the lecturer method and the technological-support method.

- **Faculty or faculty members**: This is used to mean lecturers

In research work when the methodology has been decided and used, data collected it is therefore to presented, analysed and synthesised in order to interpret and make sense out of what the informants said. This means reading through the minds of the participants about situation and the world around them. The next chapter focuses on data analysis.

5 Data Analysis

Qualitative Data Analysis (QDA) is the range of processes and procedures whereby, we move from the qualitative data that have been collected into some form of explanation, understanding, or interpretation of the people and situations we are investigating (Lewins et al. 2005). The main objective of this study was to investigate the actual use, faculty views and barriers to the integration of ICTs in teaching in the University of Buea with reference to the Faculties of Education and Health Sciences. ICTs in education are not new. ICTs have only accelerated in kind and use, changing the method of research and teaching. Questions like how do faculty members view the integration of ICTs in teaching; how do faculty members actually use ICTs in teaching; what barriers impede successful integration of ICTs in teaching, therefore preoccupied this study. At the University of Buea and with reference to those interviewed, all lecturers think that these devices are very necessary in teaching, but the question is how to procure and use them.

Data analysis is therefore classed following the order of the various research questions. This process used themes emerging from the data and those of the literature. This section deploys tables, figures, and texts for presentation and analysis of data of analysis. These findings are presenting and analysed with titles pertaining to the interpretation that relates to each research question. The data is presented and analysis at the same time for coherence and convenience.

5.1 How do faculty View ICTs in teaching?

The use of technology in a society or education depends on how users or intended users perceive it. Davis (1989) remarked that people turn to use or not to use an application depending on the extent to which they believe it will help them perform their job better. He then came out with two concepts to explain this. These were perceived usefulness and perceive ease of use. Perceived usefulness he said, is the degree to which a person believes that using a particular system would enhance his or her performance. While, perceive ease of use is the degree to which a person believes that using a particular system would be free of effort. The integration of ICTs in teaching by lecturers will therefore, be governed by their perceived usefulness and perceived ease of use, even though the social system is also a strong determinant.

This section deals with the way faculty members view ICTs in teaching. In these Faculties, faculty view ICTs as helping them to manage and to assist instructions in their teaching. According to the fourteen participants including the dean and the head of the IT department, ICTs have a greater role to play in universities teaching today. They placed a lot of importance to ICTs. Every participant including those who have not used ICTs in teaching before answered the yes to the question whether they think that ICTs are needed in teaching in the university.

5.1.1 ICTs viewed as instruction managing devices

ICTs Viewed as record storing devices. Here, the participants say they need ICTs for many purposes in their teaching and learning activities. For example, "*they say we have computer Managed instruction needs and computer Assisted instruction needs"*. In computer Assisted instructions, the computer is needed to keep students' records and marks so that they can be retrieve at any time when need be. With the computer Managed instructions, it is needed when students are sent out to the Internet do work/research and, when faculty themselves go out to do research or find material for the students. According to this claims, faculty have a higher desire to use ICTs in their teaching. Their perceived usefulness and perceived ease of use is very positive.

5.1.2 ICTS viewed as instruction assisting devices

ICTs viewed as good qualities for audio-visual teaching-learning aids. In the faculty of Education, participants see these devices as being very useful in presentations and illustrations. According to them, the visually impaired need to be in an Inclusive Setting, learning with sounds. One participant affirms that "*teaching can take place without the live teacher and ICTs meet the needs of different kinds of learners in different settings. We have audio learners who learn best with sounds, visual learners who learn best with pictures or charts and kin-static learners who learn best when they are on the task; and the computer has all those qualities"*. Further, the participant says they have a course called educational technologies in which they expose the students to all these devices even though they are not readily available. This shows that faculty have a positive view towards these devices and think that they are highly needed in teaching in the university.

In the Faculty of Health Sciences, faculty view them as very essential in illustrations, presentations and simulations. In this Faculty, one participant says "*certain complex biological diagrams cannot be drawn or represented on the board because they may take a lot of time or may be wrongly presented"*. ICTs can therefore serve this need.

ICTs viewed as a means of reducing workload. Faculty view ICTs as a strategy for reducing their workload and limiting the talking all the times. A participant said, "*when you use ICTs, they reduce the talking all times and irrespective of how a teacher prepares his lessons, he can only say what he prepared, what he can remember, or what he has time for"*. Lecturers here view that, ICTs particularly the Internet exposed students to more varied critical thinking about their courses when they access different course-related literature. Here, students get to the Internet and search for more material related to their courses and they are able to compare with the lectures they get in class. This participant remarked that it is interesting when students read different literature and make a lecture very interactive by asking questions for clarifications basing on the detailed information they get when lecturers refer them to the internet. A participant remarked that "*students usually feel happy and come to thank us for referring them to the Internet; they say they have learnt many things they did not know through this means."*

The views of all faculty members were not all that positive or the same. In the Faculty of Education, some participants have never used any form of ICTs before but they think that they are essential in today's higher education institutions. Tying this to the Innovation Diffusion Model of Rogers (1962), one realises that faculty here have the knowledge about ICTs and have therefore, compared to see that they have an added advantage to their usual delivery modes. The contrast here however, is that they know, surely from success stories and other sources that ICTs have a positive effect on education but, they are not ready to use. This claim of haven used ICTs before was made by one participant only, who even referred to ICTs as *these things*. This suggests that the rest have a positive view about ICTs in education. If lecturers have these kinds of perceptions about ICTs, this leads us to the next question of how therefore, do these lecturers actually use ICTs in teaching, as they are exclaiming that they are very important and as data show those who have used them in teaching.

5.2 How do Faculty members actually use ICTs in teaching?

It is believed that if ICTs are available and well used, they will lead to quality teaching-teaching that is learner-centred, teaching that is critical and learning that is problem-solving. These devices are used in different ways by different teachers depending on their lessons, skills and availability.

5.2.1 The use of Internet in teaching:

Lecturers use the Internet in teaching by referring their students to get more material for their courses. When home assignments are given, students are referred to the Internet, where in some cases, lecturers provide the websites or links, and in others, they do not. Faculty also browses the internet to increase their skills and get more material for their lessons.

One problem here however, is that the Internet connections are either too slow or it is very expensive especially to students. An informant said, "*I think is very expensive for the students because imagine that a student has seven assignments to search the information from the Internet; it will very expensive for that student. So how do you continue to teach using the Internet and other devices"?*

The Internet is the most regular and explicitly used ICTs in the University of Buea. The reason that was advanced was that it is accessed by students and lecturers themselves, anywhere, at anytime and at their convenience. *"It also has lots of material and relevant new literature of the works of others, so we sent students to find all these themselves, to add to what I am able to prepare for them."*

5.2.2 Laptop and Desktop computers:

Laptop computers are use for demonstrations when classes are partitioned into groups. In lecture halls where PowerPoint and projectors presentations are not made available, lessons are prepared and presented on Desktop and laptops in groups and explanations follow. This is however, a very tedious process because of the class size and when students cannot manipulate these computers alone. This is only at the undergraduate levels because

postgraduate students are only referred to the Internet in most cases. After such presentation, lecturers still read out notes to students to copy down on their notebooks.

5.2.3 Projectors, PowerPoint, Television and Telephone

When lecturers are prepare in slides, they are presented in class for students to actually see than hearing. Movies, and seminar sessions, speeches were report to be shown to students using the television. The only participant who has used the telephone in teaching reported that this was done by making contacts to students on corrections of their thesis.

5.2.4 Types of ICTs Identified in the University of Buea and their frequency of usage

The types of ICTs identified in the University of Buea were in the Internet, Laptop computers, desktop computers, telephone, PowerPoint, overhead projector, and the television. Some of the lecturers of both faculties have use either one or more than one type of the ICTs identified. These types of ICTs were gotten from participants, when they were asked what kinds of ICTs they have used or are using. They name them and the length of time they have been using each type.

Table 3: **Types of ICTs Identified in the University of Buea and their frequency of usage**

Types	**Number (out of 10) that have used ICTs**		
	Faculty of Education	Faculty of Health Sciences	Total
The Internet	4	3	7
PowerPoint	1	1	2
Laptop computer	1	2	3
Desktop computer	1	1	2
Projector	2	2	4
Telephone	1	-	1
Television	1	1	2

Developed based on the data from the field

The data revealed that ten of the fourteen faculty members interviewed have used ICTs in teaching. Out of fourteen participants in the two Faculties, ten have used the following ICTs: the Internet, desktop computer, Laptop computer, PowerPoint, projectors, television and telephone in that order. The Internet is the most frequently used as the table 1 shows, with four users in the Education Faculty and three in the Health Sciences Faculty. This makes the total number of Internet users seven out of the total of ten faculty members that have used

ICTs in teaching. Projectors come second after the Internet with two lecturers in each Faculty, while the laptops come third. One lecturer has used laptop in the Faculty of education and two in the Faulty of Health Sciences. Two lectures each have used that projector in teaching. In the two Faculties, only one participant each said they have used PowerPoint, the Television and desktop computer in teaching. No one has ever used the telephone in teaching in the Faculty of Health Sciences, with only one in the Faculty of Education.

The explanation for more projectors in Health Science Faculty is that most lessons are illustrative and presentations. Laptop used here are personal. The rest of the devices have been used once or not. The Internet seems to be the most common and easies of these devices that can be used, since it can be used individually without any proper training or fear of being embarrassed. Since participants complained that a good number of them have had little or some kinds of training for ICT use, the Internet does not need much training. In addition, lecturers do not need to be present in front of the student while teaching with the Internet, they simply need to refer the students to the Internet or publish learning material and information and ask the students to go and browse by themselves. It is also available in cybercafés off-campus where it can be accessed at any time. Faculty said they could at least refer students to the Internet with or sometimes without websites to get additional literature from the internet for preparations of examinations and class lessons or for assignments.

None of the participants was satisfied with the types and numbers of ICTs at their disposal. This because these devices are either absent, inadequate or lack of training in some cases. The rate at which faculty in the University of Buea have used ICTs is low because of lack of training, material and human resources and a defined ICT policy document. It was realised that this university has no clear ICT policy document even though it talked of it loudly in its Strategic Plan of 2007-2015.

Most participants reported that they have undergone some form of training by themselves. In the Faculty of Education, five lecturers have used ICTs in teaching, and all of them have undergone some training ranging from one to six months. Only two of the five lecturers had training initiated by the university and it was less than a week as this participant said "*they just got up one day and told us we are soon going online, without telling us how we were going to go about it. They gave a one-day training and it did not help in anyway because for someone who was not already ICT literate, the training did not mean anything, maybe it meant something to those who were already ICT literate"*.

In the Faculty of Health Sciences, five participants said they have used some form of ICTs and the data shows that only one has had a two-months training offered by the university. Three of them have not had any form of formal training. However, they have done some training by themselves for up to three months. The data with reference to both Faculties show that the older generation of lecturers do not often use ICTs as the younger generation. These are those who did their degrees at home or those who passed through the system before ICTs deeply gained grounds in education particularly in the developing countries.

Fitting this in Innovation Diffusion Model of Rogers mentioned in the conceptual framework, some of the five factors of adoption process apply here. This Innovation Diffusion Model was initially intended to answer research question one. The University of Buea in this case can be considered is the organisation and the communication channels are state, the university opinion leaders. The stages here are knowledge, persuasion, decision, implementation and confirmation. At the Knowledge stage, faculty in this university have the knowledge of the benefits of ICTs in education from state media, literature and institutional campaigns. The devices have been heard and they all have not been persuaded to use them. For example a participant says "*I am very optimistic about the impact they have in teaching, I have even read in journals. But I do not use these things so whether they are satisfactory or not does not mean anything to me, unavailability of these things do not mean much to me*." This shows that there is the knowledge about existence of ICTs in teaching but the decision not to use them has been made. This participant further says that it is as a result of his making and that of the university that he does not use the devices. This partially shows the resistance noticed in universities about lecturers resulting from their attitudes, cultures, and tribes.

Nevertheless, in other cases from the field, a majority of the faculty are willing to adopt ICTs. They long for ICT provision and training on how to use them, meaning that they know about this and are ready to know more about their functionalities. In the Faculty of Education, participants argue that learning can go on without the life teacher once the devices are there. That, ICTs like the computer have the qualities of attending to audio learners, visual learners and kin-static learners. This is an indication that the devices have been known, tested and are confirmed to be more advantageous than their other teaching/delivery methods. Thus, the comparative advantage stated in Innovation has been compared in this case.

However, this rule is not stereotyped as it may indicate. There are some contrary cases in the University of Buea with reference to Innovation Diffusion Model. Their trialability has not

been very easy. Innovation Diffusion Model suggests that if users have hard times using an innovation, they may not adopt it. This is however, not the case in the University of Buea because, out of the fourteen numbers of participants, ten have used ICTs in teaching. Those who have not use in it in teaching do not mean that they have not use or will never use ICTs before in their ordinary daily lives. In addition, out of this number only one participant says he has never use the devices in teaching.

Users perceive that their usage is complex but they are still ready to use them if provided and offered training. For example, *I have just basic knowledge to type and retrieve material from the computer, no competence; if I have to give a lecture using video conferencing, I will not be able to do so because I lack the training*. These devices are very useful in education so the university should provide them and provide training for lecturers. This is contrary to the Innovation Diffusion Model's trialability concept, which suggests that under such circumstances, user will reject the innovation. The devices are not therefore complex and difficult to use if training is provided, so lecturers in this institution will not reject the ICTs because, they are compatible to their lessons if they insist on training. As was indicated above, ICTs are viewed to be a solution to heavy workload, can assist and manage instructions and serve the needs of different kinds of learners. This is the comparative advantage over the traditional methods.

5.3 What are the Barriers to the application of ICTs in university teaching?

Studying the obstacles to the use of ICTs in education may assist educators to overcome these barriers and become successful technology adopters in future (Khalid, 2009). This is the main objective of the study. This is in view of what Ertmer (1999) asserted that although teachers today recognize the importance of integrating technology into their curricula, efforts are often limited by both external (first-order) and internal (second-order) barriers. This section presents and analyses the obstacles identified faced by lecturers of Education and Health Science Faculty of the University of Buea. From the field study and as indicated in the extended conceptual framework above, barriers to the integration of ICTs in the teaching in this university are rooted at the level of the state, the institution, and the lecturers themselves. Those determining the successful use of ICTs in the university are rooted at the level of the state, followed by the university and those of lecturers come last. For a successful use of ICTs

in education and prepare for the knowledge society, each level will have to off root (overcome) its own barriers.

In this study, the barriers identified in these two Faculties have therefore, been analysed and grouped into three main themes with respect to the weight exerted. These headings are system-rooted barriers being those of the state. They are somewhat similar to what Ertmer in (1999) classified as Extrinsic; macro-level barriers. Institutional-rooted barriers representing those of the university itself; Becta (2004) termed them school-level and Balnaskat and peers (2006) called these barriers meso-level. Lastly, Faculty-rooted barriers refer to those caused by the lecturers themselves. Ertmer (1999), termed them Intrinsic; Becta (2004) teacher-level; (Balnaskat) 2006 micro-level; Bekele (2009) leadership factors.

5.3.1 System-Rooted barriers

- ***Funding***

This is one of the most outstanding barriers to the integration of ICTs in education in almost all societies in the world as Keogh (2001) and Bekele (2009) noted. They are not only at the level of the state but also at the level of the faculty and institution. ICT infrastructure and plans, ICTs devices, ICT training and soft and hardware all need finances. Across the world today including Cameroon, funding has become a crisis to most higher education management. Funds are either inadequate or absent. Universities in Cameroon are state institutions and depend on the state for funding, and the state too has other prioritized sectors. The provision of complete ICT structures in her universities including Buea is therefore hampered by this. According to one participant, "*at the beginning of the academic year in October, the faculty is expecting funds from the state through the central administration of the university and sometimes we only receive some little funds in April when the school year is almost ending. We are continuously told, council has to meet to approve the budget, but council has not yet met."*

Under such circumstances, lecturers willing to integrate ICTs in teaching cannot because there is either the lack of budget to afford the devices or organise and train lecturers on how to use those available. This was the situation presented in Buea University. There is a course for first year undergraduate students that has been designed to introduce them to ICTs but the course has not started due to lack of funds.

- ***Power shortages or absence***

As reported by the respondents in the university, electricity is usually absent or irregular on Campus. Some lectures halls in the university are not completely wired while some do not even have Internet-connecting pod. In some cases, halls with some form of electricity suffer from very low voltages, outage and cannot support some of these devices. This makes lecturers to feel discouraged or have no confidence trying to deal with technology-related lessons, for example this respondent says, "*when you say ICT, ICT..., if I prepare a technological-aided lesson and I am disappointed when electricity goes off or the device fails me, what do I do? Then I am frustrated, what do I tell students, what about the day"?*

This barrier is place under the state because, the University of Buea is not the only institution or organisation with the situation. It is the case of many situations in Cameroon with some places going for about seven month without electricity while some places have never had it before. The state has a responsible to put in place effective power plan and ensure it efficiency and sufficiency for ICT uptake in universities.

- ***Lack of a clearly defined ICT National Policy***

Cameroon has being making many adventures in ICTs but the real realisation has not taken place. At the dawn of the 21st century when developing countries started actively embracing ICT in education triggered by UN millennium development goals, emphases in Cameroon were laid on basic and secondary education without corresponding interest on higher education institutions. A National Information and Communication Infrastructure Policies and Plans (NIC) was initiated by Economic Commission for Africa supported by United Nations Development Program in the year 2000, and proposed to the Cameroon government. Until 2006, the plan was not yet validated by the state through the Ministry of Post and Telecommunications that is in charge of ICTs. It was still being scrutinised to be handed over to the Cameroon National Agency for Information and Communication Technologies (ANTIC).

This slow nature of the process shows the government grip on ICT-related issues which universities are embedded. With such delays, it is difficult for universities to take up from where the state has to set the pace, and so integration of ICTs in teaching is a problem. Government policies have to be clearly defined so that they proceed to higher education

institutions. The lack of a well-defined National ICT policy document has painted the same picture on the University of Buea and consequently, it Faculties. The university has no defined ICT policy because they state does not also have one.

- ***Very expensive Telecommunication networks***

Participants complained that Cameroon Telecommunications (CAMTEL) is not only very expensive but provides very unreliable internet connections. As a result lecturers went ahead to engage a wireless private provider *Ringo* that became so expensive too because of state-imposed high tariffs and negotiations began again with CAMTEL.

Given the low income levels of Cameroonians, lecturers and the unemployed students, successful integration of ICTs in higher education is inhibited. This was echoed in the fieldwork process as was quoted above when a participant said the use of ICTs will be very expensive for a student who has about seven courses to search the material in the Internet. This also prevents the teacher too from continuously using ICTs in teaching since it will not make any difference.

Cameroon is one of the countries in Africa with very expensive telecommunication networks according to Ampah *et al.* (2009). From the statistics they presented, Cameroon by 2007 imposed a Value added Tax of 20% on telephony. Calling landlines in Cameroon from abroad costs at least 0.09€ while mobile is 0.12€, and this is believed to be the cheapest rate. Telephone charges are expensive in Cameroon than calling from abroad. It is also the responsibility of the state to create enabling environments for ICT providers, participants view. This should be by reducing the very high tariffs paid by ICTs suppliers. In some higher education institutions in the Northern countries, the Internet, desktop computers and the entire electronic mailing system is free. But in the university of Buea, lecturers as well as students are charged for using these devices and services, even though the university authorities have termed the prices as "a token". This may be a token to lecturers and not to the unemployed students.

- ***Rigid systems of schooling***

Traditionally, the system has been made such that the lecturers prepare lessons and teach them to students, thus introducing ICTs is not easy, and it is expensive especially with the devastating bullet of the 1985 economic recession in Cameroon. Curricular are supposed to

evolve with teachers training including ICT studies. On the field, participants expressed the need to be trained on ICT skills. The country has not made it a priority to train ICT-related skills. More teachers training colleges and institutes are continuously being created with limited measures for the ICT training. ICT-related authorities serve their needs first not that of others in the system as shown on figure 3 below. In the entire University of Buea and the two Faculties of this study in particular, government has a made it as a rule that all university authorities higher up the administrative structure have at least a computer, telephone and if possible, Internet connections.

5.4 Institutional-Rooted Barriers

- ***Absence of a well-defined Institutional ICT policy document***

With relevance of ICTs in higher education institutions today, it may be a bit shocking to many as was realised in the field that the University of Buea in general has no clearly defined/written Institutional ICT policy document. One participant said, "*As far as I know there is no written document but the university strategic plan 2007-2014 carries some brief mentioning about ICT with some emphasis."* The university strategic plan for 2007-2015 has expressed the desire to have 100% bandwidth Internet connectivity, but with no clear policy on how this and other ICTs will be implemented. This lack of policy document is attributed to two main reasons. Firstly, its absence at the national level has caused its absence too at the institutional level. Secondly, the university authorities declared, ICT has not been made the priority. For example, one of the top authorities "*said the priority is for us to get enough lecture halls and staff for the growing number of students we are experiencing."*

This poses a threat to successful ICT integration in teaching because the rules are not set on how to go about planning, provision, training and implementation. It is a rule to institute these policies with collaboration of other parties in the university. As it was reported, the coordinating board seem to works unilaterally to an extent with no formula on how to go about institutionalisation of ICTs and their related activities.

- ***Absence or Irregularity of ICTs***

One other obstacle to ICTs use in teaching in these Faculties and the entire university is the absence or irregularities of the devices. This is 2011 and the widespread 100% Internet

bandwidth connectivity by 2008 proposed on the university strategic plan 2007-2015 is not forthcoming. Not all classrooms have internet connection or connectivity pods. Despite efforts made to bring in a private network supplier called *Ringo*, the situation has not changed significantly. The available bandwidth of 2 megabytes per second is too small for entire campus; even though with an optical fibre network linking most of the buildings. The connectivity is either to slow, irregular or very expensive to afford.

Other devices like the projectors and desktop computers are very limited too. A participant said, "*You can imagine that we have far less than 500 computers in a very big campus like this one. In most cases, Faculties buy one or two computers and projectors for themselves*."According to the 2010 evaluation session of the 2007-2015 Strategic plan, the electronic database that went operational in 2009 has 22,500 scientific journal titles and articles and the library has only 12 computers. Accessing this material is a problem due to power cut or internet irregularity. The University of Buea has above 15000 students and 289 teaching staff, and a library with 12 computers makes it very difficult for ICT integration in lessons.

Participants also complained that, due to the limited numbers of ICTs in the campus and their respective Faculties, a lecturer must always book ICT-lecture halls in advance. And when they prepare lessons and do not acquire the hall because some other lecturer has booked it when his lesson is supposed to hold, it acts as a barrier because either lesson is rescheduled or delivered in the traditional way.

- ***Lack of training of faculty by the University***

Training is essential motivation in the integration of ICTs teaching. In the Faculty of Education, five lecturers have used ICTs in teaching, and all of them have undergone some training ranging from one to six months. Only two of the five lecturers had training initiated by the university and it was less than a week. This training could have been a little longer for those who did not have basic ICT knowledge to follow. This is a threat to desired ICTs faculty users. For example, some participants said they have just a basic knowledge to type and retrieve information from the computer, and will not be able to use other forms of ICTs like videoconferencing since they have no training on that.

In the Faculty of Health Sciences, five participants said they have used some form of ICTs and the data show that only one has had a two-months training offered by the university. Three of them have not had any form of formal training. However, they have done some training by themselves for up to three months.

Training is very essential for any university aiming for an effective successful ICTs use in education. Across the world universities today, lecturers have university email addresses for communication with authorities, colleagues, and correspondences with students. This is completely absent in the university of Buea. The IT unit has plans for this but it has not been realised yet.

- ***Power cuts or shortages***

This was identified as one of the main inhibitors. This is very big problem to the use of ICTs in teaching. Practically, none of the above-identified ICTs can be used without electricity. This makes their integration in lessons difficult and non-confidential. However, the university has bought and set-aside four standby generators in order to solve this problem. These generators too need fuel, technical support and cannot sustain the entire ICTs networking of the university.

- ***Lack of an institutional ICT technical unit and helpdesk***

It was realised that the two Faculties chosen for this study have no ICT technical unit for maintenance or help. None of them even possesses a computer centre or unit, except a few desktop computers dotted in few offices. In the Faculty of Health Sciences, these computers were observed instead to be mostly used by the students of Advanced School of Mass Communication in their journalistic trainings. The university has just an informative helpdesk for the email checking and orientation at the IT unit. This does not help ICT integration into teaching greatly. There is a need for such a unit for maintenance and help to lecturers and students. It is not strange that any ICT device that encounters malfunctioning is either kept aside or packed for an external technician to be contacted.

- ***Non-subscription to websites hosting learning materials***

In the University of Buea, lecturers complained about the university's inability and willingness to subscribe to websites hosting learning materials. According to its 2010 Annual

Report for Assessment of 2007-2015 strategic Plan, *"initiatives taken by the University Library resulted in an increase in the access to online electronic journals, but this has mostly been limited to open access material. The University is yet to invest significantly in subscribing to much needed research and research funding databases."* This is not only a problem in the University of Buea, but in other Cameroonian universities and the state itself. It is lamenting saying that one hardly finds literature and reliable updated facts about Cameroon on the Internet, not to talk of number of Cameroonian published journals, except those posted by donor agencies like IMF and World Bank or foreign academic writers. Lecturers in these two Faculties therefore, do not find information for teaching, and this makes it difficult referring students to search for material or additional material in the Internet since they will not find it. Instead, some lecturers reported the they contact foreign colleagues and friends to download useful journals and send to them as attachments or in other forms; order them from foreign libraries- an exercise that very few of them do given their means.

This coupled with lack of training, power outages, inadequacy and absence of ICTs, and lack of institutional policy does not motivate lecturers to integrate ICTs in their teachings. It is therefore, important for institution to take step to try to overcome all or some of these barriers.

5.5 Faculty-Rooted Barriers

- ***Lack of ICT skills and competence***

The provision of ICTs to the university is one thing and training faculty how to use them is another. Based on the respondent responses, the lack of ICT skills is big barrier to its integration in teaching. This lack of skills is due to lack of training both by the university and faculty themselves, motivation and competence. Most lecturers have just basic knowledge to type and retrieve material. None of the two Faculties has ever organised training for faculty on how to use ICTs probably because these devices are also limited or the training is expensive. This is therefore a barrier even at the level of faculty because they rely on the University for training.

- ***Age and place of educational background***

It was realised in the field that age and educational background act as barriers to integration of ICTs in teaching. The older generation of lecturers as opposed to the younger one, hardly and

do not have much desire to use ICTs in teaching. This is so particularly in the Faculty of Education. The reason here is that they did their training or degrees/studies when the idea of ICTs was still conundrum in Third World educational systems. Some even had their degrees before ICTs emerged as tools of enhancing teaching and learning, even in the well ICT-adapted developed world.

Similarly, the lecturers who did their training or degrees programs in Western Universities have a higher desire for ICT use than those who did theirs at home or neighbouring Third world Universities. Lecturers that have studied in Europe, Canada and the United States of America, each had at least a personal laptop computer. A participant said *"When I was in Massachusetts University and needed a book or journal, if it was not available, it was so easy to immediately get it for me from Sorbonne or any other place, but here you cannot do that"* .There is therefore a need for motivation. This follows in line with what Kwame (2008:1) in the University of Ghana says "*this limitation comes about through the absence of formal training in Internet applications or the general application of ICTs. The problem is worse amongst those who were hired long before the ICT revolution. The fundamental knowledge in ICT application by some colleagues were acquired, in most cases, through informal self-teaching/training when colleagues got the chance of becoming visiting professors in Northern universities"*. This suggests that it is the situation in most African higher education institutions.

- ***Time***

Times has been identified in other parts of the world as an obstacle to the integration of ICTs in education delivery. The University of Buea is not an exception to this. From field observations, time obstruct the use of ICTs in teaching in two ways. Firstly, many lecturers complained that they have very heavy workloads and do not have enough time to prepare all in technology-aided lessons. This is also affected by their low level of ICT skills. Secondly, they said that they do not have time to attend some University-organised ICT training sessions or seminars. One participant said, "*Sometimes when they talk about some of these sessions, we busy with our teaching and do not have time to attend."*

- ***Attitudes and long tradition of education delivery***

Academics have been noticed to be resistant to change owing to their different disciplinary beliefs and tribes as Betcher and Trowler (2001) remarked. In the University of Buea the case is not so different. Some lecturers have no confidence in using the ICTs in teaching. They explained that teaching has for generations been a traditional practices whereby student and teachers interact physically in a setting. A participant said, he is optimistic about the benefits of ICTs in education and has even read about this in journals but does not use them.

Here, the participant is aware (and has even "read in journals") of the importance of ICTs in teaching but not willing to use them. Another one says that tradition has been for students to come and sit in class and wait for the teachers to deliver the lessons. This is not a motivation because lecturers do not feel any pressure from students willing to learn using ICTs nor even from the institution, they belong.

- ***Dependency for Training***

In the course of the field process, all participants complained of lack of training by the university authority. According to them, it is the university to offer/organise training for ICT use. This has acted as a barrier to them to be able to integrate ICTs in teaching. They forget that learning these skills by themselves will help them in research and reduction of workload. When a participant was asked whether he thinks it is required of him to do some training for himself, he said "*yes but this is expensive, far-off and requires times".*

It is worth that the University of Buea identifies the barriers to the integration of teaching and try to overcome (off-root) or reduce them for ICT use success, preparation of graduates for the future labour market and the knowledge economy.

The barriers are related to those mentioned in the conceptual framework. However, they vary with the specific cases and context in which they are studied. The case of Education and Health Sciences Faculty at the University of Buea has some of them absent in the other different cases as can be seen on table 2. For example the idea of age and educational background is absent in the conceptual frameworks.

6 DISCUSSION

This section deals with the discussion of the results and the relation with the existing literature. In this section, they are discussed with reference to the world realities and existing literature. This section brings out the presentation of responses on a global view. In this section, the ICTs channel that was observed at the University of Buea during the fieldwork is also illustrated. The section ends with some recommendations and a conclusion.

6.1 The Pathway of ICT penetration in the university

The framework is intended to illustrate the path that ICT information and devices obtaining and use takes to go through a university system like that of Buea. This to an extent a contribution to the numerous barriers rooted at the level of the University of Buea. This illustration shows three possible stages, each with its composing members, characteristics, and reason for the ICTs presence or needs. It shows that ICTs in this institution have an officious or hierarchical order in terms of organisational structural importance, where the top-level university officials obligatorily need ICTs for communication and administration. Then, as one goes through the organisational chain from top to bottom, the immediate needs and use of ICTs diminish too, and the devices may be almost absent in some cases of the least levels. This is very similar to what Bekele (2004: 110) says, "At AAU and most other African campuses, ICTs are accessible only to a few users for a limited time." Technology pool compared to user population is far from satisfactory. Equally important are space, financial and technical staff constraints (Ibid)

In this university, the acquisition and use of ICTs is a systematic process beginning with uppermost/highest level university authorities. ICTs in Cameroonian universities are legitimately supposed to be provided by the state, because it owns these institutions. As a reminder, Cameroonian universities are state-owned and centrally controlled and funded. However, some benevolent ICT providers like NGOs, Donors, international organisations and multi-national agencies can provide ICTs to universities or directly to their Faculties. The study from which this theory is developed reveals three stages/steps in the course of ICT penetration in a university system. These have been termed the First Receivers, Second Receivers and Third Receivers of ICTs in a university, each of them representing this step-like movement.

The First Receivers

The First Receivers are made of office of the Rector or Pro-Chancellor, Vice Chancellor and other Deputies, the Registrar, Secretariats of the university central administration and other top-ranking university officials. To this category, the presence of ICTs, particularly the Desk (and in some cases laptop) computers, the Internet and the telephony system is an obligation. ICTs here are needed for administration, communications in and out of the campus, and processing and storage of all kinds of information in the university. An ICT malfunctioning of any kind is immediately attended to or calls for immediate repairs or even replacement. The probability of increasing the numbers and types of ICTs at this stage is higher than any other levels down the chain. As it is a rule, the available devices here are not for any ordinary person's use irrespective of the reason. To this group, it is unheard of to say that users pay for ICT services, as all expenses are included in the running budget of the university. However, some members of this group also possess Laptop computers and all have private mobile telephones. They also care very much for the other lower-level receivers.

These first receivers are initially intended to receive ICTs from the state, but sometimes lure to the external sources like NOGs, international organisations, multinational companies, and foreign donors. They rely on the Second receivers like the IT centres for installations and maintenance or any form of technical support. However, this category has an intension to offer ICTs devices and information to the other levels down the chain, their hindrance is the means to do. They therefore continue to pledge and call for adoption of ICTs even if they do not exist. They continue to draw plans on ICTs even when they are not also available to be used.

The Second Receivers

The Second Receivers are composed of Faculties and Schools, Dean of Faculties, Vice Deans, Faculty Officers, and higher-level secretariats in those Faculties. Here, the immediate need of the devices is still important but at a limited degree as compared to the top-ranking officials especially in a case of adequacy and types. The number and types tend to decrease from the top-level. This could not be an intension of the first receivers, but the means could be the problem. This category deals with top-ranking officials and may in some cases not deal with the outside world without the approval of the former (central administration) that represent the top-ranking officials. However, this is normal in administration and the degree

of delegation of power. Members of this order or stage have limited ICT devices and always ask for more and can sometimes buy some for themselves after over-waiting for response from above. This is the category that seems to legitimately have a firm grip over the use of ICTs for training of faculty and teaching if the technologies are readily and adequately available. They too to an extent are expected to pay for ICT services and device use like the Internet even at the IT Unit.

This category can lure for external support from NOGs, international organisations, multinational companies and foreign donors. Their support can be given to the entire Faculty/school or a particular department depending on the specials needs and the program. This is particular of the Educational Faculty where UNESCO donated desktop computers for the training and teaching of special needs students. However, they Faculty has no total claim on the computers as they are well cared of by the UNESCO Chair through whom the aid came. Teachers of this program teach the special needs students with these computers, building the capacity of the students and theirs at the same time.

This category depends on the IT unit for training and teaching, downloading of learning material and technical support or helpdesk for students and their lecturers. This category however, suffers from diverse and divided opinion of whether or not to use ICTs in teaching. Some faculty members do not even see any reason why "these things" should be used. This stems from age and education background all boiling down to lack of training and motivation. Such types of feeling about ICTs can also be attributed to fear as they see ICTs are being complex. It is difficult for someone to have much courage to engage in something that he has never thought of using.

The Third Receivers

The Third Receivers are the Departments and Heads and faculty members (lecturers) and their own secretariats. In this category and the proceeding one, the real meaning and intended use of ICTs needs to be concentrated here. However, surprisingly, the category may have just one or even none of some kinds of ICTs present in the two previous stages. They are promised ICTs of which they are always patiently waiting. Here, ICTs use carries less weight and sometimes not seem as a priority or being obligatory too from the first order members. Technological-aided programs are designed and taught sluggishly with hopes to have ICTs in a time not forthcoming. ICTs needs are high but hardly come through, and the constant

demands and reminders repeatedly may become a singsong to the expected providers being the top-level category. For example, a participant said *"instead of organising partisan meetings and compensating those who attend these meetings, the money should be used to buy at least one computer for simulations for my students. But each time a colleague of mine gets up to talk about ICTs in administrative meetings, he is told to sit down and he is challenged by saying that "we already know what you want to say". I remember an HOD was even sacked from his position because of his constant fight and request for the use of ICTs in this university..."*

This is an indicator that, this category in the university organisation highly needs ICTs but this is not seen as important as it would have been in the previous orders. This participant also believes that there are some other means to through which ICTs can be provided but, the those responsible use the means for some other priorities. Consequently, in most cases, those who have their private computers can use them for their lessons or whatsoever. Lecturers complained that due to discouraging pay packages, those who cannot buy private ones go for some ICTs like in the cybercafé and PowerPoint slides preparation out of the university. This category pay for their ICTs services like the Internet even within the university IT Centre. Following the observations and discussions with the IT unit, it seems the science departments are getting more ICT attention that the liberal arts and humanities.

Members of this category usually long for a university-organised training and motivation for the use of ICTs in delivering their lectures, which are not forthcoming. As observed in the university, most lecturers decided to approach a private Internet provider called Ringo for wireless internet connection, which is either absence most of the times, is too slow or very expensive. Members of this category also take initiatives to solicit for ICTs provision from donor agencies outside the university milieu. This is the case of the Faculty of Education where UNESCO donated desktop computers for teaching and training of Special Needs Education Department. The lack of these devices has therefore acted as a barrier to lecturers willing to integrate ICTs in their teaching. The pathway is represented on figure 3 below with links between the various receivers.

Figure 3: ***The Pathway of ICT penetration in the University of Buea***

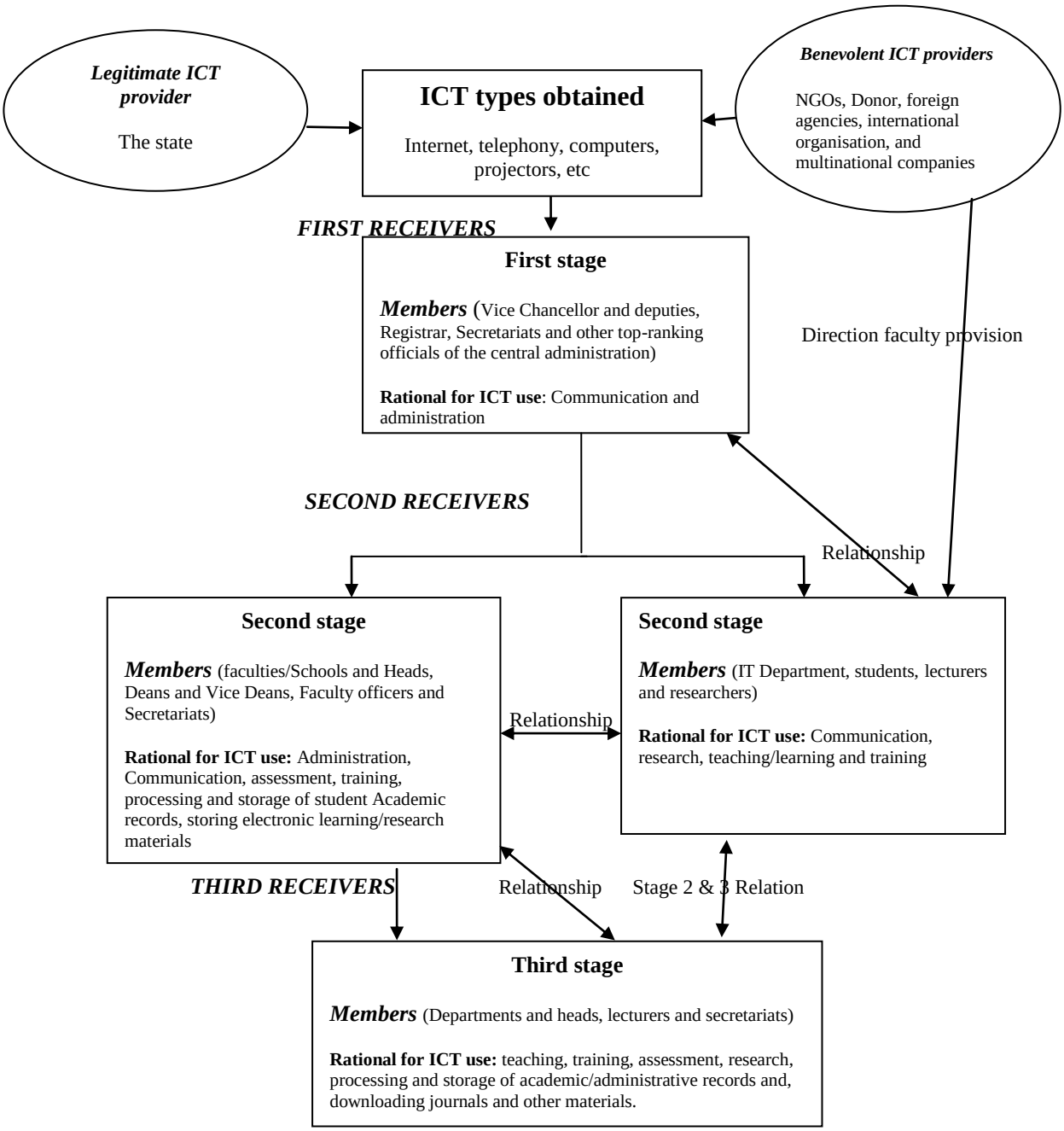


Figure 3 above portrays a picture of the stages and importance of ICTs provision in this institution. Even though some stages of the university organisation structures are prioritised, there is high degree of interaction between the various stages. Firstly, they all legitimately depend on stage one (which to an extent represent the state) for provision, policies and decision-making and implementation. They link up for training, installation and maintenance, technical support, research and learning. It is fascinating to remark that all the other stages

interact with the IT Unit of the University for these reasons above. This indicates the importance of ICTs in present day higher education institutions.

Another relationship between the three categories is that they constitute the structures (the social system) of a university with students at the centre. This university has visions and missions to achiever and can these be driven and enabled by ICTs. They count on all the stages for the achievement of these missions and visions. Accountability, responsiveness and assurance of quality prevailing in the world higher education system today, and have also been mentioned on the 2007-2015 university strategic plan of this institution, have many dimensions of evaluation of students. ICTs knowledge in the quality of graduates is very essential for the labour market and future research works. In the current internationalisation of high education drive, lecturers as well as their students need to have some ICT basic knowledge to qualify. Consequently, the importance of these devices should be considered and the devices provided at all levels in the university.

6.2 Broad-Spectra relationship of the theory

This figure has a relationship with the stages and adopter categories of Rogers Innovation Diffusion Model, which shows how a new idea or innovation spreads through an organisation. ICTs represent the innovation and the University of Buea is the social system. The systematic obtaining and use of the ICTs is the communication channels over a period. Therefore, ICTs in this institution are moving from one administrative unit to the other over time, as soon as are they are available. From the analysis of the field-gotten information, the decision to embrace ICTs is positive even though the decision is what Rogers call authority innovation-decision. First, second and third receivers' terminologies are intended to demonstrate Rogers's adopter categories in this context.

The rate and degree of adoption in this institution is however, not directly linked to all the factors advanced by the Innovation Diffusion Model. For example, it is slow with a small number of receivers not necessarily because of the factors he advanced, but by the insufficiency of the devices, lack of funding, training and attitudes. Conclusively, the Innovation Diffusion Model has pointed out factors that determine the degree and rate of adopting an innovation in an organisation. These factors are knowledge, persuasion, decision, confirmation and implementation. Based on the situation of Buea University if considered as

an organisation, one other determinant (factor) is availability or provision even though it seems contextual. The Innovation Diffusion Model does not explicitly identify the fact that availability/provision and constant use can also determine the degree and rate of adoption of an innovation in an organisation. It does not also say how people in an organisation adopt an innovation and what happens when it is adopted, or how they can be made to adopt it.

This illustration shows that there is a digital divide that is existing between developed societies and their university and their developing world counterparts. From the report of International Telecommunication Union (2009), Africa is very backward in telecommunications networks and that has a negative effect on their economies. Africa south of the Sahara falls into what we may be describe here as the laggards of the Innovation Diffusion Model. This is attributed to their late reception and adoption of ICTs.

Relatively, figure 3 in broad shows how ICTs have made their way very late into some societies in the world particularly, developing countries. The rate at which they are penetrating is slow, and the devices begin from to top institutions of these societies (those that have been described in Innovation Diffusion Model as the being more socially forward or have a higher social status). For example, in Cameroon the state has been making tremendous efforts in computerising ministries and institutions with the slogan e-governance. Most state-owned institutions are equipped with computers and the Internet. This is particularly of the ministry of Public Service and Finance, and Post and Telecommunication. Universities, which according to AAU (2009), are the developers and leaders of ICTs in the society are not placed equally with these other institutions.

During the time of medieval and early modern universities, societies were reluctant about science. This was so particular of the German ideology until she was bypassed by the USA. The reluctance about science therefore prevents the means for scientific research and its importance in the society because societies interested in science seek for reliable methods of research and its knowledge acquisition, sharing and application. This is the situation in most developing countries today. The quest for science is still a deadlock amongst societies in developing countries, where a majority of knowledge and research is on the humanities and the other liberal arts disciplines. Teaching and research methods have evolved, but these countries are still finding ways to cope with the mass enrolment of students, acute shortage of staff , poor inadequate infrastructures and human resources. For example, a university official said “the priority is for us to get enough lecture halls and staff for the growing number of

students we are experiencing". This is the way of seeing things by the officials and not the lecturers. No other lecture made this statement. Even though the lecturers blame the university authorities for not providing ICTs and organising training, they still recall that this is because the hands of these authorities are tied in terms of funding.

Basing on the quote above, it is remarkable that lecturers and university administrators do not see the situation through the same lens. While the faculty complained of no attempt made by their Faculties to offer training, Faculty authorities saw things differently, for example, questions of ICTs policy, infrastructures addresses to university authorities, and training were answered by "*plans are underway with the central administration*. They claimed that they have offered training to faculty but none of the faulty members interviewed recognised this." It is common that the nature of things could make authority speak for the interest of the system.

This study reveals that the late entry of science and ICTs in particular into the developing countries is affecting their societies and the institutions that constitute them including higher education systems. This is evident in Kizza's (2009) opinion that Africa had a late start in the race to acquire the information communication technologies (ICTs). This author further says, this last place in the race, compared to other continents, has had tremendous implications in the development plans for the continent. This corresponds with what Rena (2008) said that Africa is one of the underserved continents in terms of information and communication technologies. Traditional technique of teaching and research still largely dominate in higher education institutions in Africa and Cameroon is not different. The digital divide between the developed societies and the less developed ones is very wide leading to the latter's continuous sense of isolation. This digital divide will open more widely if measures are not taken to narrow it.

These countries like Cameroon have then realised their importance but are not able to fully engage due to the sufficient funds to afford the technical, infrastructures and human resources needed for effective implementation. For example, a National Information and Communication Infrastructure Policies and Plans (NIC) was initiated by Economic Commission for Africa supported to by United Nations Development Program in the year 2000, and proposed to the Cameroon government. Until 2006, the plan was not yet validated by the state through the Ministry of Post and Telecommunications that is in charge of ICTs. It was still being scrutinised to be handed over to the National Agency for Information and

Communication Technologies (ANTIC). This is in line with what Kwemain and Taco (2010) pointed out that very little information exists on the Internet regarding the use of computers and Internet technologies in education in Cameroon. This is an indication of Cameroon's position in relation to the use of ICTs in education. Some information may be existing but not yet posted on the Internet due to lack of means and resources. Generally, little information about Cameroon is found in the Internet. International Organizations and financial institutions like the World Bank and the International Monetary Fund mostly post facts and statistics one finds about this country on the Internet.

In Cameroon, students only engage in micro-software computer lessons upon completion of their degree programs, mostly when asked by employers. Graduate unemployment in Cameroon is somewhat attributed to this and can block job and academic opportunities abroad. In Cameroon, most teachers and students do not have access to the internet due to the following reasons; either it is absent in their localities or very expensive to afford, they do not know how to operate, irregular or the lack of electricity. Lecturers in most Cameroonian universities still teach using the chalk and the chalkboard and reading out notes for students to copy. This is not a good strategy for student-centred learning and critical thinking. The networking of faculty members with university emails addresses has become a rule in almost all higher education institutions in the world for teaching, communication and collaboration with colleagues and students. It is striking that in the University of Buea, lecturers do not have these university-organised networking email addresses. Some do not even have, for example a participant indicated that he does not use ICTs and whether the are available and satisfactory is not his concern. The university has been working on this however, but it is to be operational.

The study suggests that the entire University of Buea is aware of the importance and benefits of the ICTs in higher education, but it is very slowly making efforts to engage in their integration. For example, they declared that they are aware of the importance of ICTs in education but the problem is how to get them. This is because of the lack of necessary human, financial, material and technical resources required for putting in place a successful ICT structure in a higher education institution. In order not to be eliminated from the future labour market and knowledge society or train "the 21st century illiterate", Cameroon should develop its own ICT strategies by drawing experiences from the already adapted ICT regions of the world, so that her universities pick up from there.

The use of ICTs is gradually entering in Cameroon beginning with topic organisations and institutions. For the last five years now, the Cameroon government has been increasingly talking about E-Governance and has introduced the some computer and the Internet in some government ministries. This is however, inhibited by the lack of technical support and capability and ability of the intended users to effectively use these devices. As it was found out on the field in this research, most Cameroonian services and decision-making positions are stocked by the older generation of civil servants who feel that they have been bypassed by the "e-world" of today. A similar situation was realised in the University of Buea when the older generation of lecturers do not or reluctantly use ICTs.

Relating the research questions, findings and analysis of data to the outside world, one realises that teaching learning styles and aids will continue to change, and more quest for knowledge will developed. This quest will be accompanied by the ability to look for more reliable and conducive research methods. At the University of Buea, faculty view ICTs as a means to academic and professional achievement.

6.3 Conclusion

So long as science and the quest for new knowledge continue to grow, new forms of acquiring and sharing this knowledge will continue to develop, requiring institutions and their members to adjust themselves from the traditional way of life. ICTs are changing the landscape of higher education in terms of forms or methods of research and teaching. This study revealed the various barriers that impede successful integration of ICTs in teaching Buea University's Education and Health Sciences Faculty. Obstacles like funding, power shortages and outages, lack of ICT policy, expensive networks, attitudes, and lack of training, time, education background, and age impede this process in teaching. These ICTs are subjected to different views, actual use by faculty members and their integration in teaching is confronting a number of obstacles at the individual, institutional and national levels. Students and lecturers have aims of reaching higher heights; institutions have aims and visions, national government and other stakeholders require accountability, responsiveness and efficiency from these institutions. This therefore means that the two Faculties together with the universities need to identify and overcome these obstacles before ICTs can be successfully integrated in teaching.

Other major findings indicated that there are mixed feelings about the role of ICTs in teaching. Some faculty members encourage and want to use them and others are not. The types of ICTs identified are not properly used as shown on table 2 above. This therefore shows that, ICT success cannot come easily, requiring university ICT policy-makers to seek for ways to motivate faculty members to upgrade themselves about this. It recommendable that students, faculty members and institutions continue to ask themselves how they are going to be actively involved in the quest for the new know, how are they going to inquire the truth and go beyond using new forms of teaching, research and learning

The findings also revealed a number of ways in which faculty members are using ICTs in teaching. For example, referring students to the Internet and so on. This indicates that if the enabling environment is made, the rate of ICT adoption and use will be accelerated.

It is important that a similar study as this be conducted in the same university but different Faculties or the entire university. Another area of further research should be the perception of students in learning using in ICTs and their satisfaction, inhibitors, actual use and ease of using the devices. For example the AAU (2009), reiterates that Access to these tools thus becomes a matter of critical importance for any African university that seeks to become viable and effective in training its students, producing and disseminating knowledge, and preparing the next generation of citizens with adequate skills and the capacity to ensure national growth and economic development.

6.4 Recommendations

In many situations and regions, ICTs have been recognized to have a remarkable benefit on education. ICT has the ability to offer new ways of flexible, custom-based education available to anybody, everywhere and anytime, paves the way for different kinds of learning environment that is e-learning (Tiffin and Ragasingham 1995, 118: Cross and Adam 2007). It changes higher education landscape by changing the nature of its students body to include working students, as well as students from across the globe, since they can study when and where they prefer; it provides lifelong learning opportunities to those currently excluded from learning, those residing in remote areas, disabled and disadvantaged (Keogh 2001). ICTs act as a catalyst for massification, provides opportunities for a variety of public and private institutions to offer education programs through the internet (Ibid). They can however, create

tension between intended users and legitimate providers like the case at the University of Buea when a Head of Department loose the position because of his frequently demands for ICTs.

Even though ICTs are not ultimate ends to education process itself, having its weak sides, their importance in today's higher education cannot be undermined. It is therefore important that Cameroon and the University of Buea should embark on these devices especially in education. This can be done through the following recommendations. Since the barriers are rooted at various echelons, the recommendations have been separated too.

6.4.1 Recommendations to the System level

In this study, we recommend that the state should continue the campaign for the role of ICTs in national development and in the entire educational sector. She should prepare a clearly defined and well-detailed ICT policy document accompanied by the policy instruments. The Ministry of Higher education should eventually prepare guiding principles about this together with the desire and targeted population in Universities. When this is done, it will serve as a good starting point for what it takes to achieve ICTs success in a society aiming to become an emerging nation by 2035 as it is the vision in the country now.

The state should equally ensure proper provision of ICTs especially the Internet, with a secured network, which is affordable. This can be done by reducing taxes or tariffs for ICTs provision, regulating unscrupulous providers and putting in place monitoring committees. It is important for Cameroon together with her higher education institutions to continue to broaden their collaboration and pledges for ICTs help from the external education bodies and organisations.

It is understood that complete funding of a satisfactory ICT structure is very expensive, but the state should set at least a reasonable ICT status for its universities. A proper monitoring commission for transparency and accountability of ICT funds can be put in place. Cameroon has been doing a lot in general E-governance in general, but specificities are very essential for specific institutions. Task forces can be commissioned to pinpoint the immediate pressing ones, so that they are supplied for universities to pick up. The emphasis laid on ICTs in basic and secondary education by the state at eh eve and after the dawn of the third millennium,

should also be laid on higher education institutions with specific task for institutions, lecturers, and may be students.

6.4.2 Recommendations for the University of Buea and its Faculties

At the level of the University of Buea and the Education and Health Sciences Faculties, the first effort should also be a clearly defined and well-detailed ICT policy document accompanied by the policy instruments, may be taking from the state and success stories of other institutions and countries. This document should carry an elaborate plan, objectives, resources, infrastructures and how to go about it. In this plan, the target groups should be identified and there should be collaboration between the various units in charge of ICTs, for example, the vice deputy chancellery in charge of teaching, professionalization and the development of ICTs and the intended users.

The earmarked interuniversity network should be developed for Internal and External communication and collaboration. The available bandwidth should be increased from 2 megabytes per second to a sustainable one.

The University and Faculties should equally establish a university ICT technical unit and helpdesk for students, teachers and researchers. This unit will help in information, training and maintenance. There should be a university ICT commission to constantly follow up lecturers' training and retraining on new ICT devices and skills like PowerPoint presentations and videoconferencing. Similarly, curricular should be reformed to ICT-enhanced curricular to permit faculty and students alike to be involved in the new modes for the quest of knowledge. AAU (2009) recommends, Ultimately, therefore, strengthening the use of ICTs in the university curriculum, selecting ICT applications from abroad, and introducing ICTs into the larger society should be seen as an institutional responsibility.

There is a high need for training and retraining and follow up of ICT skills. Opportunities and incentives to innovate must be widely distributed in the university, and rewards for success should be provided through recognition and promotion. While in the institutions, these Faculties together with the university can organise ICT short courses and award professional diplomas and certificates to participants. This will motivate faculty members in engage to ICT integration in teaching and they will in turn learn for themselves. This can be a gradual move towards the demystification of technological complexes.

In addition, it is recommended that the university and Faculties particularly Education and Health Sciences should consider some basic ICT knowledge (disciplinary-based and general) prior to the recruitment of lecturers. This will urge prospective lecturers to go for this and it will in turn help in solving the problem of lack of or poor training on ICTs skills. Those already in the Faculties should be systematically convinced, constantly motivated and reiterate about the importance and benefits of integrating these devices in teaching. Faculty members should be created university email addresses for communication and collaboration.

It will be recommended as a wise decision to encourage bottom-up ICT policies with just a blend of the two directions. This is to get the voices and opinions of ICT target population. The university should vote for a separate ICT budget for soft/hard ware acquisition, development, and maintenance, expertise, and license fees.

The Faculties can also develop and encourage ICT-related collaborative (interdisciplinary or interuniversity and even international) research projects. Cooperation ties between the University of Buea should not only be on the exchange of students and staff but, on collaborate in online teaching and learning functions with the others.

faculty and students from around the world (AAU, 2009). This will also urge faculty members to realise that there is a shift in higher education delivery from the traditional teacher-led to blended interactive settings. These too, should be design in a way that it encourages, motivates and lead to promotion.

6.4.3 Recommendations for faculty members (lecturers)

The study suggests that faculty all members should acknowledge the fact that ICTs are greatly enhancing the manner of teaching and research in the academe. Therefore, it is essential to endeavour to embrace those who are sceptical in using ICTs by demystifying the complexes surrounding them and their attitudes. In order to do so, attitudes must change in favour of these new ways of knowledge acquisition and dissemination.

Secondly, lecturers should also create time for attending ICT seminars, preparing ICT-related lectures. It is of great importance that lecturers should find ways of training themselves without necessarily depending or waiting for the institutions to do so. This is because they

will know better when they themselves devote time to learn and the knowledge will help them as individuals too in their own private affairs.

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Appendices

Appendix A: *Interview guide*

A. Interview guide for lecturers

Information and communication technologies (ICTS) are devised set of technological tools and resources for creating, storing, managing, and communicating Information. The new digital Information and communication technologies are combinations of hardware and software, multimedia and delivery systems. They exist as common items that include desktops, notebooks, laptops, televisions, digital cameras, local area networks, intranet, the internet, worldwide web (www), and CD-ROMs. Their applications include word processing, spreadsheets, tutorials, simulations, electronics mails, digital libraries, computer-aided designs, computer-mediated conferencing, and videoconferencing. The world trend today has attributed a lot of its achievement on ITC

Sex (Here, it was noted down by the researcher it is a natural attribute)

1. How old are you? (Optional)

2. How long have you been teaching in this Faculty?

3. In which department(s) do you teach?

4. Which subject?

5. Which level (class?)

6. Have or do you use ICTs in teaching?

7. If yes, what type(s) of ICT(s)

8. In which level(s)

9. How long have you being using ICTs in teaching?

10. Are they owned by the school or they are yours

11. If you have not used them in teaching, do you think ICTs are need in teaching in the in this faculty?

12. Please, can you explain why?

13. What obstacles do you face when teaching with ICTs?

14. What do you think can be done to overcome these obstacles, if they exist?
15. Have you undergone some pedagogical training for the use of ICT?
16. If yes, for how long?
17. Was it an individual initiative or by the /Faculty university?
18. Were you satisfied with the training?
19. Please, can you explain why?
20. Are you satisfied with number of and types of ICTs used in your department?
21. Why?
22. What do you think should be done to improve this state?

B. Interview guide for university authorities and the Deans

Information and communication technologies (ICTS) are devised set of technological tools and resources for creating, storing, managing, and communicating Information. The new digital Information and communication technologies are combinations of hardware and software, multimedia and delivery systems. They exist as common items that include desktops, notebooks, laptops, televisions, digital cameras, local area networks, intranet, the internet, worldwide web (www), and CD-ROMs. Their applications include word processing, spreadsheets, tutorials, simulations, electronics mails, digital libraries, computer-aided designs, computer-mediated conferencing, and videoconferencing.

1. Have you set up policies?
2. Do you have ICT strategic plans?
3. what does it constitute?
4. Have you set up ICT infrastructures?
5. Do you think ICT is needed in university teaching?
6. Please, can you explain?
7. Do you have ICTs as part of your objectives/curriculum?
8. What types and for which levels of the faculty of Education?
9. How much resources to you make available for devices in a year.
10. Are they enough?
11. Why?
12. Do you offer training to teachers?
13. How do you make sure that the use of these devices is effective?

14. What are difficulties faced by your department in ensuring the effective use of these devices?

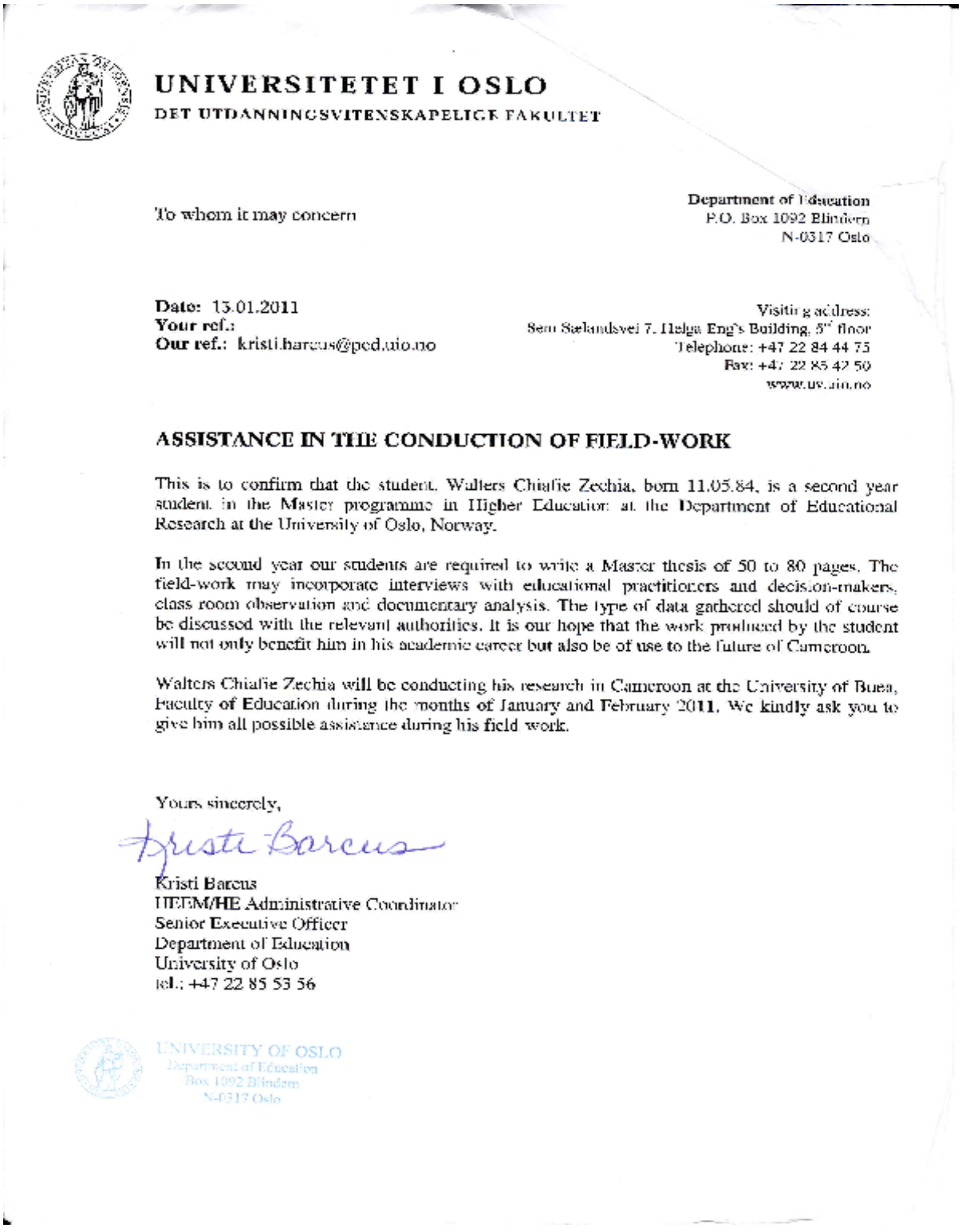
15. Do you think that ICT improves teaching?

Appendix B: Public and private universities/Higher Institutions of learning in Cameroon

State Universities	Private universities and other Higher Institutions of learning	ownership
Yaounde I	Catholic University of Central Africa in Yaounde	Private
Yaounde II	Université des Montagnes in Banganté	Private
Buea	Adventist University in Nanga-Eboko	Private
Douala	Bamenda University of Science and Technology in Bamenda	Private
Dschang	International University of Bamenda	Private
Ngaoundere	Advanced Institute of Science and Management in Daoula	Public
Maroua	Advanced Institute of Management in Douala	Public
Bamenda	Advanced Institute of Development Information and communication in Yaounde	Public
	Advanced School of Management in Douala	Public
	Advanced School of Science and Technology in Douala	Public
	British College of Professional management in Douala	Private
	Gruope Tankou in Bafoussam	Private
	Institute of Information Technology in Duoala	Private
	Samba Advanced Institute in Yaounde	Private
	Siantu Advanced Institute in Yaounde	Private
	FONAB Bamenda	Private
	National Polytechnic Bambui	Private
	The intermittent Nacho University in Bamenda (closed)	Private

Zechia 2009; 2011

Appendix C: Introduction letter from the University of Oslo



UNIVERSITETET I OSLO
DET UTDANNINGSVITENSKAPELIGE FAKULTET

To whom it may concern

Department of Education
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Date: 13.01.2011
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ASSISTANCE IN THE CONDUCTION OF FIELD-WORK

This is to confirm that the student, Walters Chiafie Zechia, born 11.05.84, is a second year student in the Master programme in Higher Education at the Department of Educational Research at the University of Oslo, Norway.

In the second year our students are required to write a Master thesis of 50 to 80 pages. The field-work may incorporate interviews with educational practitioners and decision-makers, class room observation and documentary analysis. The type of data gathered should of course be discussed with the relevant authorities. It is our hope that the work produced by the student will not only benefit him in his academic career but also be of use to the future of Cameroon.

Walters Chiafie Zechia will be conducting his research in Cameroon at the University of Buea, Faculty of Education during the months of January and February 2011. We kindly ask you to give him all possible assistance during his field work.

Yours sincerely,

Kristi Barcus

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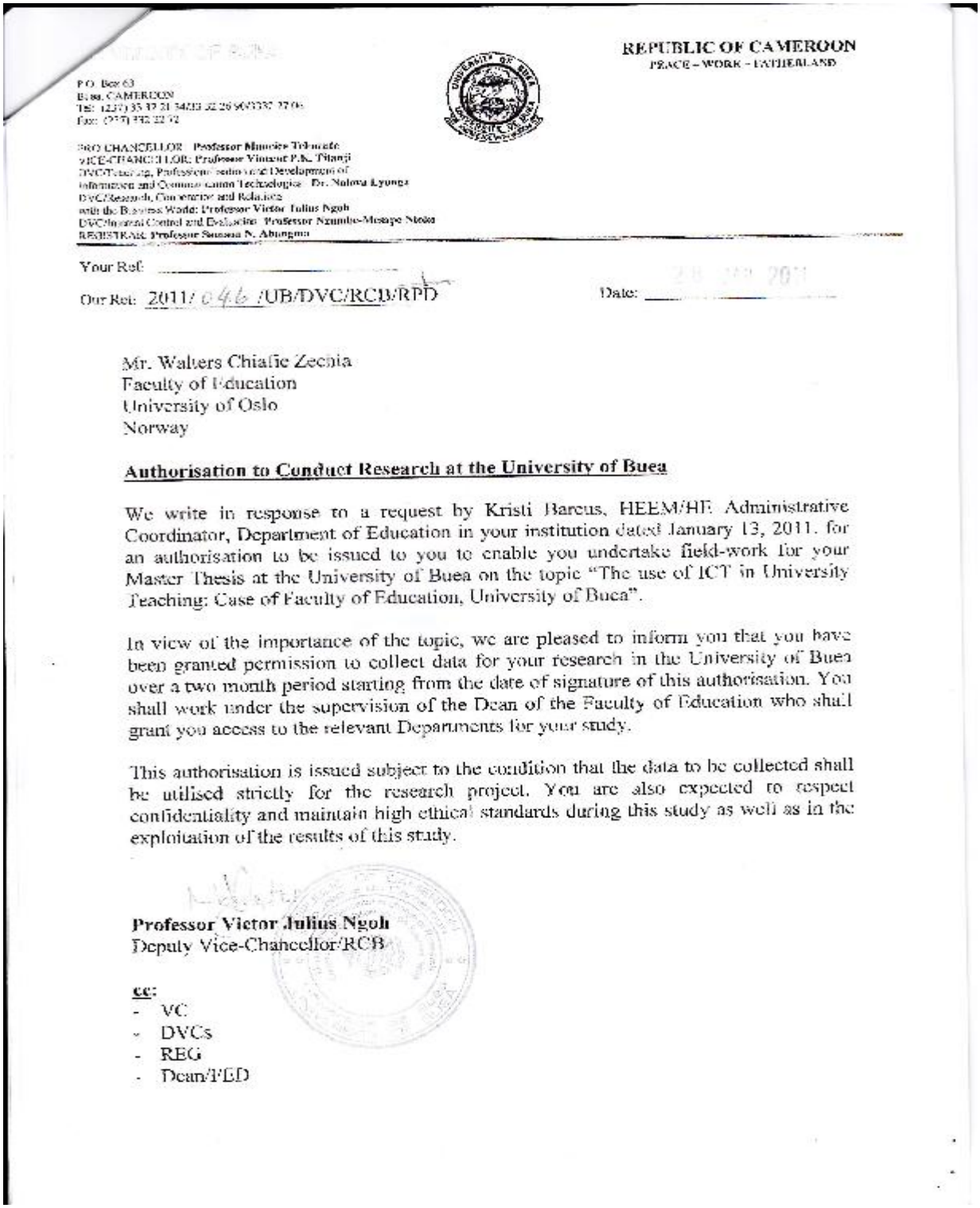
Appendix D: Authorization Letter to Conduct Research at the University Of Buea



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REGISTRAR: Professor Susanna N. Abuagma

Your Ref: _____

Our Ref: 2011/ 046 /UB/DVC/RCB/RPD

Date: 28 JAN 2011

Mr. Walters Chialie Zechia
Faculty of Education
University of Oslo
Norway

Authorisation to Conduct Research at the University of Buea

We write in response to a request by Kristi Barcus, HEEM/HF Administrative Coordinator, Department of Education in your institution dated January 13, 2011. for an authorisation to be issued to you to enable you undertake field-work for your Master Thesis at the University of Buea on the topic "The use of ICT in University Teaching: Case of Faculty of Education, University of Buea".

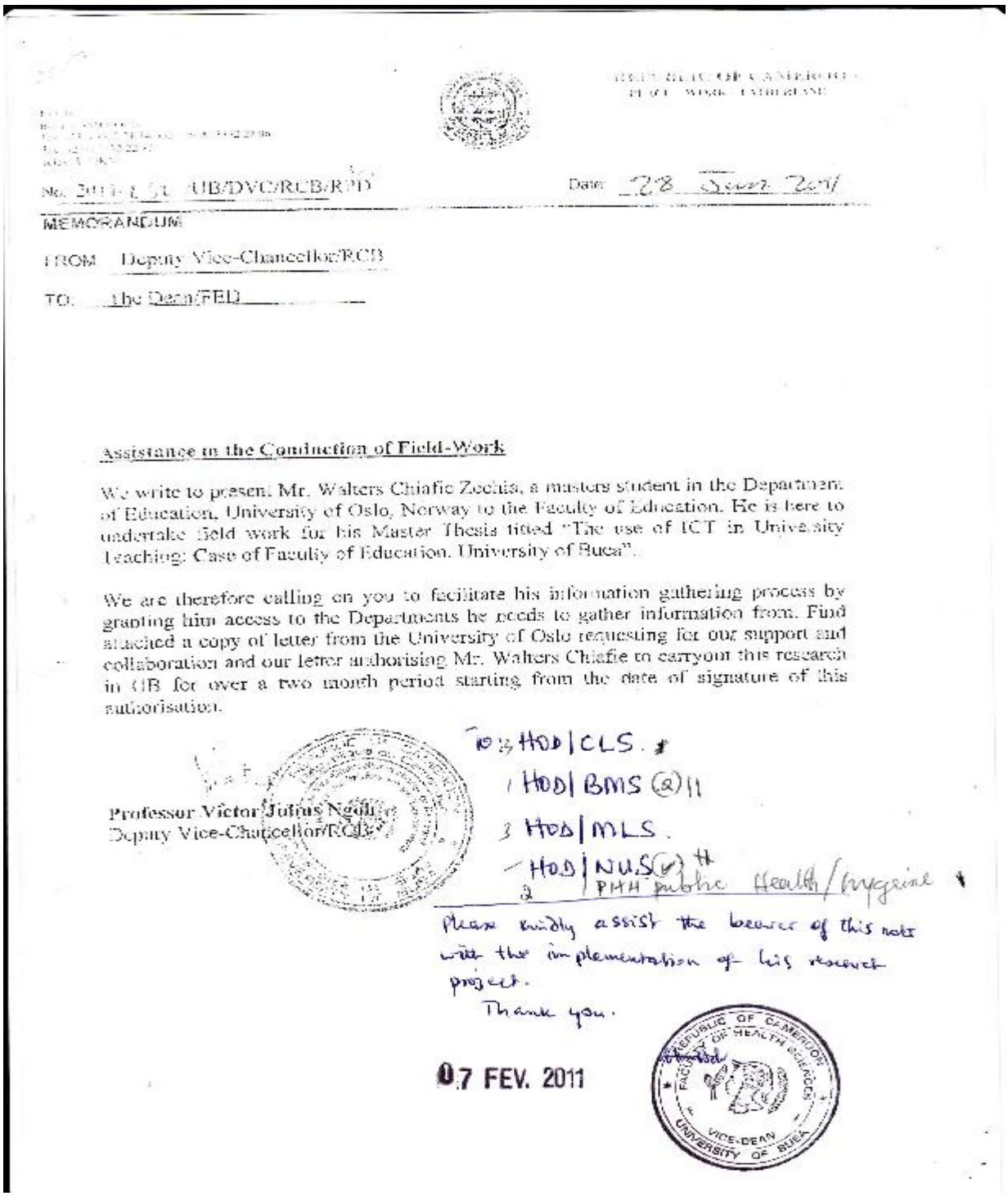
In view of the importance of the topic, we are pleased to inform you that you have been granted permission to collect data for your research in the University of Buea over a two month period starting from the date of signature of this authorisation. You shall work under the supervision of the Dean of the Faculty of Education who shall grant you access to the relevant Departments for your study.

This authorisation is issued subject to the condition that the data to be collected shall be utilised strictly for the research project. You are also expected to respect confidentiality and maintain high ethical standards during this study as well as in the exploitation of the results of this study.

Professor Victor Julius Ngoh
Deputy Vice-Chancellor/RCB

cc:
- VC
- DVCs
- REG
- Dean/FED

Appendix E: Authorization letter for Faculties' assistance in the conduction of fieldwork



No. 2011-L 51 /UB/DVC/RCB/RPD Date 28 Janv. 2011

MEMORANDUM

FROM Deputy Vice-Chancellor/RCB

TO: The Dean/FED

Assistance in the Conduction of Field-Work

We write to present Mr. Walters Chiafie Zechia, a masters student in the Department of Education, University of Oslo, Norway to the Faculty of Education. He is here to undertake field work for his Master Thesis titled "The use of ICT in University Teaching: Case of Faculty of Education, University of Buea".

We are therefore calling on you to facilitate his information gathering process by granting him access to the Departments he needs to gather information from. Find attached a copy of letter from the University of Oslo requesting for our support and collaboration and our letter authorising Mr. Walters Chiafie to carryout this research in UB for over a two month period starting from the date of signature of this authorisation.

Professor Victor Julius Ngoh
Deputy Vice-Chancellor/RCB

To: 1 HOD/CLS.
2 HOD/BMS (2)
3 HOD/MLS.
4 HOD/NUS(2) PHH Public Health/Hygiene

Please kindly assist the bearer of this note with the implementation of his research project.

Thank you.

07 FEV. 2011

REPUBLIC OF CAMEROON
FACULTY OF HEALTH SCIENCES
VICE-DEAN
UNIVERSITY OF BUEA

Appendix F: INFORMED CONSENT FORM

Topic: *Integration Technologies in teaching: A case of Buea University*

Student Researcher**: Zechia Walters Chiafie.**

University of Oslo, Norway.

Contact:78771618; zewalchia@yahoo.com

The Researcher

I agree not to reveal the identity of any participant of this study.

I agree to treat information collected in strict confidence.

I agree to use anonymous quotes in the publications of the results of this work.

The Participant

I confirm that I have read and understood the information sheet for the above study and have had the opportunity to ask questions.

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason.

I agree to have the interview/consultation **Audio Recorded**.

I agree to take part in this study process (please, tick) **Yes No**

Participant's Name	Date	Signature
_____	_____	_____
Researcher's name	Date	Signature
_____	_____	_____